國立臺灣大學管理學院企業管理碩士專班

碩士論文

Global MBA

College of Management

National Taiwan University

Master Thesis

再生金融理論的系統解讀

System Interpretation of Regenerative Finance Theory

辛格拉曼

Ramandeep Singh Saini

指導教授: 薛喬仁博士, 許文馨博士

Advisor: Joe Hsueh, PhD & Wen-Hsin Hsu, PhD

中華民國 111年 09月

Sep 2022



國立臺灣大學碩士學位論文 口試委員會審定書

Master Thesis Certification by Oral Defense Committee National Taiwan University

再生金融理論的系統解讀

System Interpretation of Regenerative finance theory

本論文係辛格拉曼君(R08749079)在國立臺灣大學企業管理碩士專班 完成之碩士學位論文,於民國 111 年 9 月 13 日承下列考試委員審查通過及 口試及格,特此證明

This is to certify that the Master thesis above is completed by <u>Ramandeep Singh Saini</u> (R08749079) during his/her studying in the Global MBA Program at National Taiwan University, and that the oral defense of this thesis is passed on <u>(13/09/2022)</u> in accordance with decisions of the following committee members:

口試委員/Committee members:

图为加仁

英語撰著品質委員/English Proficiency Examiner:

系主任、所長(Department Chair/Program Director)

Acknowledgment

First, I would like to express my sincere gratitude to my advisor Dr. Joe Hsueh for giving me the opportunity to work on this project. I truly appreciate his patience, invaluable guidance, and constant encouragement throughout the thesis process.

I would also like to thank the committee members, Dr. Audrey Hsu and Leon Van Jaarsveldt, for their patience and thoughtful feedback.

I want to give my most profound appreciation to Brian Blankinship of SIMFO for long video call discussions, constant guidance, and support throughout the process. A special thanks to Ian Macrae of SIMFO for his help and tips on Kumu.

Many thanks to John Fullerton for listening to my long presentations on a video call. His industry insights, detailed explanations, and constructive feedback helped me to learn and greatly improved my map.

Lastly, I am grateful for my family and friends, whose constant love and encouragement keep me motivated and confident.

Abstract

The Financial system is critical in mobilizing the capital for sustainable development. United Nations estimates that \$5-\$7 trillion in investment is required to achieve sustainable development goals. Mainstream sustainable finance is necessary but not good enough as sustainability primarily focuses on mitigation and adaptation. There is a need to transform the financial system that works in regenerating the economy. Regenerative finance uses a holistic approach to address the systemic flaws in the financial system and design based on the regenerative living system principles. Much of the literature on regenerative finance is theoretical and difficult to apply. There has been no study before to use the system thinking process in a complete regenerative finance theory. This study examines how the system thinking process adds value to the regenerative finance theory by translating it into a system map. John Fullerton's writings on regenerative finance and System Impact Multi-Family Office (SIMFO) methodology were used to build a system map. The study reveals that system thinking helps communicate the theory easily, quickly, and effectively. It also helps in engaging the stakeholders effectively. Stakeholders can turn this map into an action map for collective action. Moreover, it can be used for educational purposes to raise awareness. Lastly, it adds value by making the system structure explicit, which is missing in theory.

Keywords: Regenerative finance, Climate change, Sustainability, System thinking, System map

Table of Contents

ACKNOWLEI	OGMENT	IV
ABSTRACT		v
1	INTRODUCTION	1
1.1	BACKGROUND	1
1.2	RESEARCH PROBLEM	3
1.3	RESEARCH METHODOLOGY	4
1.4	IMPORTANCE AND SIGNIFICANCE OF THE STUDY	5
1.5	STRUCTURE OF THE THESIS	5
2	LITERATURE REVIEW	7
2.1	NEED FOR A REGENERATIVE MODEL	7
2.2	REGENERATIVE PARADIGM	9
2.3	SYSTEM THINKING	13
3	RESEARCH METHODOLOGY	16
4	SYSTEM MAP	19
4.1	THEORY OF CHANGE MAP FOR A REGENERATIVE FINANCIAL SYSTEM	119
4.2	SYSTEM MAP FOR REGENERATIVE FINANCIAL SYSTEM	22
4.3	STOCK AND FLOW	22
4.3.1	Investment Chain	23
4.3.2	Natural and Other Non-Financial Capital	28
4.3.3	Credit Created by Banks	29
4.4	SYSTEM DYNAMICS	30
4.4.1	Project Outcomes	30
4.4.2	Basic Economic Value Creation	34
4.4.3	Allocation of Credit	38
4.4.4	Financial Leverage optimizes efficiency	43
4.4.5	Financial Institution Consolidation	45
4.5	SPECULATION	47
4.5.1	Speculation reinforces short-termism	47
4.5.2	Additional drivers of Short-Termism	49
4.5.3	Reliance on GDP to measure Economic Growth for prosperity	51
4.6	LIMITS OF FREE MARKET	53
4.6.1	Market Completion or Financialization of the Economy	54
4.6.2	Externalities	56
4.6.3	Stranded Assets	57
4.7	LIMITS TO INVESTMENT	60
4.8	GOVERNMENT ROLE IN THE SYSTEM	62
5	LEVERAGE POINT ANALYSIS	64
5.1	CURTAIL SPECULATION	64
5.2	REDUCE LEVERAGE	65
5.3	REGULATE FOR FRACTAL STRUCTURE	66
		771

5.4	PRIORITIZE BUSINESS FORMATION	
5.5	REFORM TAX SYSTEM	68
5.6	TEST SOVEREIGN MONEY	
5.7	REALIGN FISCAL SPENDING AND INVESTMENT PRIORITIES	69
5.8	REALIGN PUBLIC RESEARCH INVESTMENT	71
5.9	REDESIGN PHILANTHROPIC INCENTIVES AND CONSTRAINTS TO ACCELERATE IMPA	ст71
5.10	ESTABLISH CAPITAL INVESTMENT REVIEW BOARD (CIRB)	72
6	DISCUSSION	74
6.1	LIMITATIONS AND FURTHER RESEARCH	76
7	CONCLUSION	77
REFERE	NCES	78
APPENDI	IX A: SYSTEM MAP OF REGENERATIVE FINANCIAL SYSTEM	82

List of Figures and Tables

Figure 1: Trajectory of Ecological Design	8
Figure 2: Nested structure showing Finance, Economy, & Society embedded in	D. D.
Biosphere	10
Figure 3: Eight Principles of Regenerative Vitality	13
Figure 4: Three Stages of SIMFO Methodology	16
Figure 5: Theory of change map for a Regenerative Financial System	21
Figure 6: Chart showing the division of the Investment chain	23
Figure 7: Investment chain showing all the possible investment options	27
Figure 8: Eight forms of capital considered by the author in his theory	28
Figure 9: Natural and other Non-financial capital stock & flow	29
Figure 10: Credit Created stock and flow	30
Figure 11: Regenerative Investment Growth Loop	31
Figure 12: Degenerative Investment Growth Loop	32
Figure 13: Positive and Negative outcome of the projects in real economy	33
Figure 14: Natural Growth reinforcing loop.	34
Figure 15: Savings into investment reinforcing loop	35
Figure 16: Business Revenue Cycle reinforcing loop	36
Figure 17: Central bank regulates the credit creation balancing loop	37
Figure 18: Short-term profit drives Credit Creation in private banks	39
Figure 19: Success to the Successful archetype	41
Figure 20: Fixes that backfire archetype - Regulations penalize real economy	43
Figure 21: Incentives drive short-term decision making in leverage buyout industry.	44
Figure 22: Hedge funds leverage to speculate in market	45
Figure 23: Financial Institution (Bank & Non-Bank) consolidation loop	46
Figure 24: Speculation reinforces short-termism	48

Figure 25: Additional drivers contributing to short-termism	50
Figure 26: ESG transparency drives decision making in firms	51
Figure 27: Focus on Economic growth for prosperity	53
Figure 28: Financialization of the economy to drive economic growth	54
Figure 29: Dynamics depicting the limits of market	57
Figure 30: Escalation archetype depicting the issue of stranded assets	60
Figure 31: Limit to Investment	62
Figure 32: Government roles in the system	63

1 Introduction

1.1 Background

Human activity causes climate change concluded by Intergovernmental Panel on Climate Change (IPCC) in 2022. Climate change creates risks and impacts that, if it surpasses sustainable limits, cannot be adapted and mitigated by humans and ecosystems. Therefore, climate-resilient development requires actions from society to transit the system, reinforcing the resilience of ecosystems and society (Pörtner et al., 2022).

The United Nations launched the 2030 Agenda for Sustainable Development in 2015 with an ambitious goal to set the world on the road to peace, prosperity, and opportunity for all people on a healthy planet. The 17 Sustainable Development Goals (SDGs) were designed to achieve sustainable development in three dimensions - economic, social, and environmental, that call for a complete overhaul of the Financial, Economic, and Political structures. Tremendous political will and bold actions were required from all Stakeholders to achieve SDGs by 2030. However, global efforts have fallen short of delivering on the promises made. The Covid-19 pandemic has triggered another unprecedented Health, Economic and Social crisis that caused the achievement of SDGs to be even more challenging (Nations, 2020b).

Sustainable development supports and often facilitates the necessary societal and system transformation to limit global warming to 1.5° C above pre-industrial levels (IPCC, 2018). Failing to achieve this would cause more frequent and severe extreme weather conditions worldwide.

Addressing social, economic, and environmental challenges like rising poverty, climate change, and even pandemic threats requires massive financial resources and

investment toward a climate-resilient economy (Levy, 2021; Nations, 2018; Pizzi et al., 2021). The United Nations estimates that \$5-\$7 trillion in investments are required to meet the SDGs (Craig, 2020). However, only \$360 billion is managed in ESG-related funds, which is only 0.4% of global assets under management (AUM) (Beslik, 2018). Therefore, it is critical and challenging to raise new funds and channel available assets toward more sustainable investments to transition to a low-carbon economy (Development, 2014; Nations, 2015).

Sustainable finance emerged as a strategy to allow investment toward sustainable development. There are many definitions of sustainable finance, but it essentially means investment decisions that incorporate Environmental, Social, and Governance (ESG) factors. In 2020 alone, capital markets raised more than \$400 billion of funds, consisting of \$357.5 billion from sustainability bonds and \$76.5 billion from green bonds (Nations, 2020a; Refinitiv, 2020). However, these investments are still insufficient to achieve the scale of change required to tackle climate change. There are many other green shoots like ESG investing and Green finance, but they all fall under sustainable finance.

Investments' scale and time frame are one issue, but design thinking underlying sustainable finance is another. Sustainability is still primarily based on the reductionist worldview and aims for mitigation and adaptation practices. It is a necessary step in addressing today's complex issues, but it is not good enough. Therefore, there is a need for a new system that sustains and regenerates. We need to transform our financial system in service to a regenerative economy. Regenerative finance uses a system approach to address the systemic flaws in the financial system and design it based on the principles of a universal living system, systems that prosper over time.

This thesis hopes to contribute to this new approach by exploring the system thinking process and regenerative finance.

1.2 Research Problem

There is extensive literature available to study regenerative finance. For instance, Economist John Fullerton, in his 2015 booklet, Regenerative Capitalism, introduced Regenerative Economics. Later in 2018, he released a series of papers on Regenerative Finance. He emphasizes the need for a systemic approach in finance. However, there are two significant challenges. First, most regenerative finance literature is theoretical and difficult to apply to complex issues.

Another challenge with diverse stakeholders solving complex problems is that they do not understand the numerous and often non-obvious ways their work is interconnected (Stroh, 2015). The finance system is complex and involves multiple stakeholders like banks, fund managers, insurance companies, charities, etc. They strive to achieve their individual goals without realizing how their actions create unintended consequences and impact another system. The challenge is to raise stakeholder awareness and change behavior.

System thinking can help the stakeholders to understand the non-linear causal relationship of their actions by using a causal feedback loop. Creating causal loops reveals common patterns of system behavior, allowing for further study and intervention.

Considering the above challenges, the guiding research question of this paper is:

How the system thinking process adds value to the regenerative finance theory by

translating the theory into a system map?

This paper is based on the work of John Fullerton (Author). He is the founder and president of Capital Institute, an organization that encourages transforming our Economic and Financial system into a more just and regenerative world. The Author had extensive work experience in the finance industry before starting Capital Institute. He is a committed impact investor himself and a co-founder and advisor to many firms working in the Regenerative and Sustainability paradigm.

Much of this paper is informed by the following articles of John –

- Regenerative Capitalism: How Universal Principles and Patterns Will Shape
 Our New Economy
- 2. Finance for a Regenerative World: Act I Context
- 3. Finance for a Regenerative World: Act II The Failures of Finance
- 4. Finance for a Regenerative World: Act III Towards Regenerative Finance and a new Investment Theory
- Finance for a Regenerative World: Act IV Agenda for Genuine Financial
 Reform

Several of his other writings, blogs, and interviews also informed this paper.

Over the course of writing this thesis, I engaged the Author in his work. His

constructive feedback, suggestions, and insights into the financial system also helped
enhance the Map.

1.3 Research Methodology

System thinking methodology is employed to translate the theory into a system map. The system tool, Causal loop diagramming (CLD), is used to build the map. Once

the system map was completed, the author was engaged, and the map was presented to him to see how he perceived the value brought by the system map to his theory.

1.4 Importance and Significance of the study

The regenerative paradigm is an emerging alternative to the sustainability paradigm. Different fields have adapted regenerative design and development, from Agriculture (Giller et al., 2021; Lal, 2020; Schreefel et al., 2020) to Urban Design (Caniglia et al., 2019; Woo, 2014) to even Economics.

This paper is a first attempt to translate the regenerative finance theory into a system map using the system thinking methodology. This thesis contributes in two ways – First, it transforms the regenerative finance theory into a system map which is not done before using the system thinking methodology. This provides an opportunity to look from a systemic perspective. Second, this paper is one of the few studies that help to understand how the system thinking process adds value to any theory with an example of regenerative finance.

1.5 Structure of the Thesis

This thesis consists of different sections. Chapter 2 describes the need to use a regenerative model. It also covers an introduction to the regenerative paradigm along with a definition of Regenerative finance. Chapter 2 also includes an introduction to system thinking.

Chapter 3 provides a detailed explanation of the methodology used to translate the theory into a system map.

Chapter 4 presents the theory of change map. It describes in a simplistic view how vision can be achieved with changes required to achieve that vision and interventions affecting those changes. It also covers the complex system map with stock

and flows, key stakeholders, and the causal relationship between different variables, highlighting the dominating structures in the form of archetypes.

Chapter 5 covers the leverage points proposed to have a maximum impact on the system. Each leverage point will be discussed in detail and how it changes the system's behavior.

Chapter 6 presents the findings after building the map. This section describes author feedback and perception of how this system map adds value to his theory. It also covers the stakeholders that would be benefitted from this map.

Lastly, Chapter 7 provides a brief conclusion of the entire thesis.

2 Literature Review

2.1 Need for a Regenerative model

Sustainability is the mainstream phenomenon and has made significant progress in the last 20 years. The sustainable approach has been expanded and adapted to almost all areas of life today. However, it has largely failed to shift socio-ecological pathways toward sustainability (Ives et al., 2020). Biodiversity and society degradation continue to accelerate to the point that "we are in a planetary emergency" (Lenton et al., 2019; WWF., 2016).

Sustainability is necessary for saving our planet but not good enough. By definition, Sustainable means "development that meets the needs of the present without compromising the needs of future generations to meet their own needs" (Brundtland, 1987). The problem with sustainability is that it doesn't factor in the damages already done and how to reverse it. It means it is not adding any more damage but not replenishing anything. Also, several studies show that the sustainability paradigm is no longer helpful. Unsustainability is increasing at an alarming rate on a global and local scale despite sustainability growth in practice and the scientific field (Lenton et al., 2019; WWF., 2016). The reason is its inability to move beyond the reductionistic worldview, dependence on fragmented and technological efficiency, and focus on weak leverage points (Du Plessis, 2012; González-Márquez & Toledo, 2020). It is high time for a new approach that mitigates and regenerates.

Regenerative architect Bill Reed put sustainability and Regenerative on the spectrum of approaches, as shown in the Figure 1.

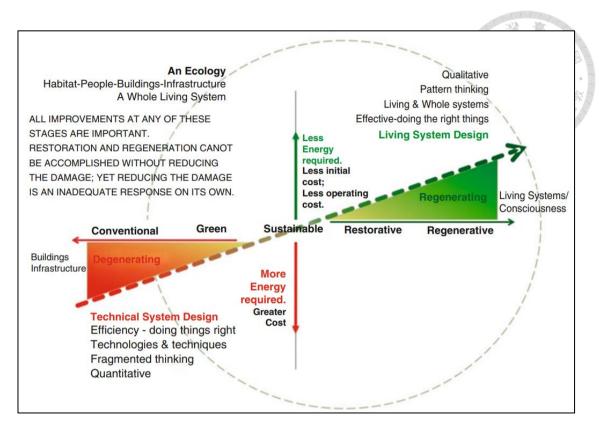


Figure 1: Trajectory of Ecological Design

Source: Mang, P., & Reed, B. (2020). Regenerative development and design. Sustainable Built Environments, 115-141. Copyright 2000-2017 by Regenesis Group

The technical system design on the lower left represents conventional reductionist thinking that is degenerative, depletes resources, and creates more waste. On the other hand, the design of the living system on the upper right is regenerative and revives resources. All these efforts from reductionist to natural system are part of the journey to a regenerative system. As seen in Figure 1, Sustainability is the neutral point that signifies no more damage. If we aim only for sustainability, we would pause climate change rather than reverse it.

Therefore, we need to aim for regenerative potential in the upper right quarter where humans are not only an integral part of nature but also participate in nature's health. That results in the co-evolution of the whole system. The following section describes the regenerative paradigm in detail.

2.2 Regenerative Paradigm

As explained by Author, the regenerative paradigm essentially represents a profound move from Mechanistic or Reductionist thinking to Holistic thinking. Reductionist thinking simplifies a complex situation by breaking it into manageable components that can be thoroughly examined. Reductionism is suitable for making scientific analyses, and it has been the reason for all the discoveries or technological advancements we made in the last century. However, this mechanistic worldview is different from the living system worldview. The World is interconnected and interdependent. Many of today's vexing problems, from climate change to Social inequalities, result from this thinking as we see economies separate from the greater whole, i.e., society and the biosphere.

In contrast, Holism is defined as "the tendency in nature to form wholes that are greater than the sum of the parts through creative evolution" (C., 1926). The World is made up of "Wholes" (cells, organs, body, etc.) is the core premise of Holism, and all wholes are nested in larger wholes. For instance, Cells merge to form organs, and organs, in turn, form sub-systems like the Circulatory system, all of which are embedded in our bodies. This dedication to developing the potential and effectiveness of every living being, from smallest to largest whole systems, is the hallmark of a regenerative economy. Likewise, when viewed holistically, Finance is a sub-system of the real economy further embedded in the human culture. Human culture is enmeshed in the biosphere (Fullerton, 2018a).

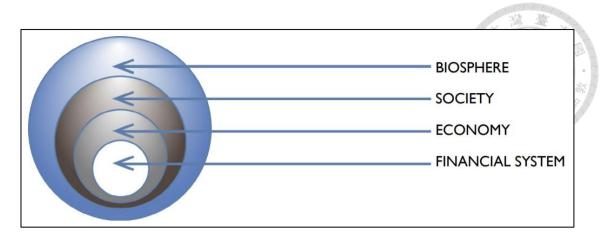


Figure 2: Nested structure showing Finance, Economy, & Society embedded in Biosphere

Source: 2. Fullerton, J. (2015). Regenerative Capitalism: How universal principal and patterns will shape our new economy. White paper of Capital Institute. https://capitalinstitute.org/wp-content/uploads/2015/04/2015-Regenerative-Capitalism-4-20-15-final.pdf

Regeneration is the property of the living systems. The principles that govern the living systems can act as a framework to help know if one is working at the regenerative level. These living systems (from the human body to large ecosystems) principles were being translated by Scientists and could also be directed to Non-living systems like Economy and Finance.

Regenerative finance is the result of these ideas. The author describes it as the financial system in service to a real economy designed based on universal patterns and principles of the living system (Fullerton, 2018a). Therefore, these living system principles will be used to examine whether the financial system works at a regenerative level.

8 Principles of Regenerative Vitality

Regenerative Finance in service of the real economy has based on the following eight key interconnected principles that build regenerative vitality (Fullerton, 2015).

The presence of one or a combination of any of these principles moves the system towards regeneration.

- 1. **In Right Relationship** In the regenerative economy, there is no absolute separation between human society and biodiversity. Different systems or whole and their greater wholes have a symbiotic relationship with each other.
- 2. **Views Health Holistically** Harmonization of multiple kinds of wealth is essential to the regenerative system. True wealth is not only financial capital; it is viewed holistically beyond financial, material, and technological capital and includes social, cultural, experiential, and spiritual. However, natural capital is the foundation of all these other forms of capital.
- 3. **Innovative, Adaptive, Responsive** Only the most "fit" will survive in this ever-changing and accelerating world. That means who is innovative and adaptable to change. Therefore, regenerative systems are the ones that are responsive to the changing environment while fulfilling the needs of systemic health rather than individual desires only.
- 4. **Empowered Participation** Contribution to the health of the whole is a unique quality of regenerative systems. It means that all parts must also contribute to the health and well-being of their larger wholes while fulfilling their own needs.
- 5. **Honors Community and Place** Each Human community is shaped by its unique history, traditions, culture, local environment, etc. A regenerative economy fosters healthy and resilient communities and territories individually shaped by their history and place.
- 6. **Edge Effect Abundance** The dominant patterns in place are weakest at the system's edges. There is where creativity and abundance thrive synergistically.

Therefore, working collaboratively across the edges is transformative for communities and individuals.

- 7. **Robust Circulatory Flow** Likewise, human health depends on the robust circulation of oxygen, nutrients, etc., the circulation of money and information, and the effective use and reuse of materials are vital for individuals, businesses, and economies to fulfill their regenerative potential.
- 8. **Seeks Balance** Being in balance is essential to systemic health. Regenerative systems always seek a balance between multiple variables with both/and thinking rather than either/or mindset. They pursue balance rather than optimizing one variable. For instance, the Regenerative economy pursues a balance between Efficiency and Resilience rather than optimizing only the efficiency component.

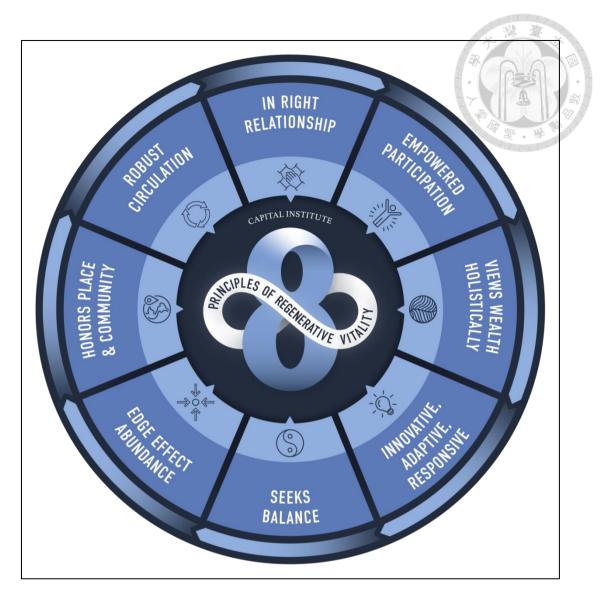


Figure 3: Eight Principles of Regenerative Vitality

Source: From Capital Institute, n.d. (https://capitalinstitute.org/8-principles-regenerative-economy/)

In a nutshell, regenerative finance demands a profound shift in people's understanding of the world. Hence, we must adopt a regenerative paradigm informed by living systems principles as the basis for economical designs, decisions, and actions.

2.3 System Thinking

Einstein observed, "The significant problems we face cannot be solved with the same level of thinking we were at when we created them" (Stroh, 2015). Today's

problems, whether rising inequality or escalating threats caused by Climate change are all complex and chronic social problems. As nations are progressively interconnected due to globalization, our social systems are becoming more complex. International Trade created strong economic feedback loops that bind the nation together. Thus, any change in one nation causes a ripple effect in another (Arnold & Wade, 2015). Therefore, conventional thinking appropriate for simple problems is no more appropriate for such complex issues. We need System thinking to tackle such problems.

Donella Meadows defined a System as "an interconnected set of elements that is coherently organized in a way that achieves something" (Meadows & Wright, 2008). This definition points to the fact that a system must contain three things – Elements, Interconnections, and Purpose. For example, the digestive system. Its elements include teeth, enzymes, stomach, and intestines. They are interrelated through the physical flow of food and a sophisticated system of regulating chemical messages. Its purpose is to break down the food into its fundamental nutrients and deliver those nutrients into the bloodstream (another system) while eliminating useless wastes.

There are many different definitions of System thinking found in the systems community. However, I have considered Ross D. Arnold definition -

"Systems thinking is a set of synergistic analytic skills used to improve the capability of identifying and understanding systems, predicting their behaviors, and devising modifications to them in order to produce desired effects. These skills work together as a system" (Arnold & Wade, 2015).

The essence of this definition is in its simplicity and utility. System thinking provides analytical tools to understand the system and its behavior to achieve the desired purpose with suitable modification.

Regenerative finance is one complex system that consists of many sub-systems. A complex system can't be easy to understand with conventional linear thinking as it comprises many feedback loops. For example, regulators use capital constraints to regulate the banking system. During the crisis, high constraints initially saved the banking sector but penalized small banks as they could not manage the high constraints and failed. This sends a negative feedback loop back into the system causing another failure. This is where system thinking is helpful. It is easy to understand such feedback using causal relationship loops. This is the reason to use system thinking for the Regenerative finance case.

3 Research Methodology

I have used the methodology developed by Systems Impact Multi-Family Office (SIMFO) to compose this paper. SIMFO is a system change company that partners with multi-stakeholders to catalyze system change towards a Regenerative economy. Dr. Joe Hsueh is the CEO and co-founder of SIMFO. He is also a founder of Omplexity and Co-founder of the Academy for System Change which focuses on advancing the field of awareness-based systemic change to accelerate ecological, social, and economic well-being.

The SIMFO process is divided into three stages based on the degree of complexity with time, as shown in Figure 4.

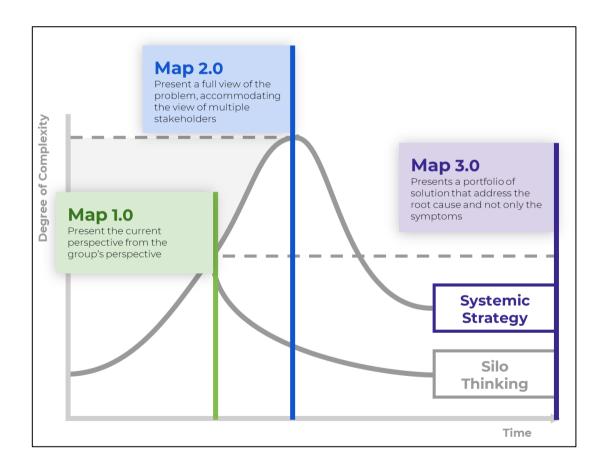


Figure 4: Three Stages of SIMFO Methodology

Source: SIMFO

System mapping tool is used to bring together different mental models. The whole process involves engaging the multiple stakeholders iteratively and bringing together many different perspectives or mental models to picture the complete system. Then engage those stakeholders in changing that system to achieve the desired results. For my thesis, the Casual loop diagramming (CLD) tool is employed to map the system.

These three stages are discussed in detail below -

1. Map 1.0

Map 1.0 is a convening phase where a small group of core people, who are close to the problem, or even an individual is engaged. As the interview is taken, mapping their mental model is immediately started, how they think the system works, and their set of necessary solutions. At this stage, the model is relatively simpler than the real picture.

2. Map 2.0

The next stage in the process is to engage a wider group of stakeholders to form a complete picture of the system. At this stage, a lot more perspective and ideas are added to the model, making the model much more complicated. Once it is realized that enough stakeholders and perspectives are added to the model, they will be asked to narrow down the most important components, dynamics, barriers, and elements in the map, followed by the most important interventions to achieve an overall vision. Map 2.0 follows a dialogic flow where first, as much information as possible is inserted in the model, then narrowed down to the most important ones. This step can go to multiple layers depending on the number of stakeholders engaged.

The main difference between Map 1.0 and 2.0 is the number of stakeholders engaged. Map 1.0 is a smaller group perspective, whereas 2.0 involves a larger group. However, both maps or iterations are just reflections of each other. When Client comparing these 2 maps, they recognize the difference before and after engaging the stakeholders. This is when their understanding becomes richer and more nuanced. Their mental model change and they comprehend that different interventions are required. It is expected at this stage that the mental model of the original client will be upgraded through engaging with other stakeholders.

3. Map 3.0

After going through the above steps comes the theory of systems change map. The theory of change is a simplified form of the overall complex map required to persuade key stakeholders and raise awareness among the public outside the system for collective action. The final step in the SIMFO process is developing a system change map theory. This map is an action map that comprises the most important interventions that can be leveraged to have maximum impact.

I have attempted to translate the mental model of John Fullerton into a system map by reading his writings on regenerative finance instead of starting with an interview. The scope of this study is limited to stage 1, Map 1.0, due to the time constraint and resource availability. However, I have engaged the author two times over the course of writing this paper to validate his mental model.

4 System Map

This section presents a Theory of change map and the complete system map.

This System maps are based on the American context.

Although the theory of system change map comes at Stage 3 in SIMFO methodology, the purpose of adding the theory of change map here is to give a simplified view of my overall complex map. This gives readers an aerial view of which key stakeholders or dynamics are significant to change the system. The theory of change map is explained very briefly, whereas the details of dynamics within the respective system are explained in the overall system map in later sections.

Since the Causal loop diagramming tool is used to build a map, it is useful to know its language. Other legends are explained as it occurs in the text.

- Positive Causality It means the result element changes in the same direction as its cause element. It is depicted with a solid line on the map.
- 2. Negative Causality It means the result element changes in the opposite direction as its cause element. It is depicted with a dotted line on the map.
- Reinforcing loop It is also known as the Engine of growth or delay. This
 feedback loop reinforces a change in one direction.
- 4. Balancing loop It is also known as Goal seeking processes. This feedback loop seeks to resist further change in a given direction.

4.1 Theory of Change map for a Regenerative Financial System

The Theory of Change map is a simplified model that defines long-term goals and then identifies changes required to achieve that goal using causal relationships.

Interventions are then mapped to demonstrate what stakeholders believe it will take to make the changes and when. (Taplin et al., 2013)

My Theory of change map in figure 5 aims to maximize investment in regenerative projects that eventually regenerate Natural and Non-financial capital. This dynamic is depicted with the most important reinforcing loop, "*Regenerative Growth*," in the system change map. Several preconditions or engines of growth have been identified that are needed to achieve our goal.

To increase the investment in regenerative projects, allocation and mobilization of credits or debt are extremely important. Regulated and governed well, these credits will be allocated to productive business enterprises so that these businesses can invest in a productive real economy. Productive real economy or regenerative projects are used synonymously in this paper until otherwise mentioned. Productive here mean projects that have positive social and environmental impacts. This will reduce the financial leverage in the economy and improve the relationship of banks with productive small firms making the whole banking system resilient. Hence resilient financial system.

Responsible financial investment considers ESG factors and embraces long-term investment. It could help managers and investors consider long-term value potential in financial and environmental terms. This will allow the capital expenditures of big corporations to flow into a productive real economy. Also, this will reduce the cost of capital for the new green and social businesses needed to invest in the real economy

Focus on holistic growth rather than economic growth will be crucial for policy formulation and prioritization in the economy. It will favor investment towards regenerative projects and helps in designing an economy that cares about natural and

non-financial capital. Suitable metrics that account for other forms of capital besides financial will help assess holistic growth.

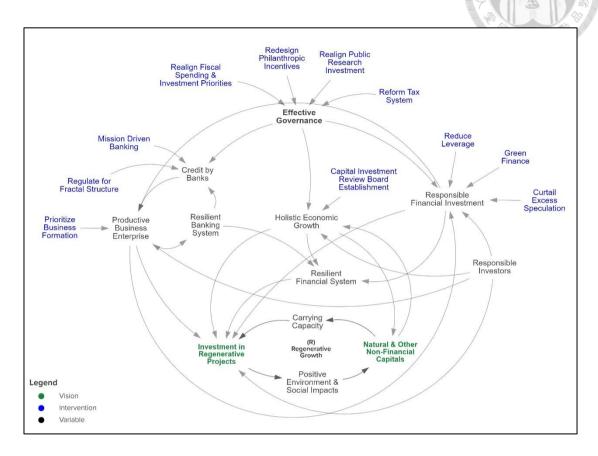


Figure 5: Theory of change map for a Regenerative Financial System

Leaving each system to its forces draw them to degenerative behavior due to the current economic system that focuses on optimizing efficiency at the cost of resiliency. This makes the system fragile and prone to collapse easily. Therefore, governance will significantly influence the safety and how the system behaves. Effective governance will ensure that each system's purpose and behavior are aligned with the overall vision of a regenerative economy. For instance, governance in the form of a regulatory framework in the banking system plays a massive role in establishing the stability of the whole sector. However, they don't have the power to decide credit allocation. Banks

enjoy the freedom to allocate the money where they find opportunity. So, effective governance will ensure that the credit allocation is aligned with the vision.

The preconditions or changes discussed above that are required to achieve the goal will not happen on their own. Interventions are required to influence the behavior of the individual system. These interventions are plotted on the map in blue color. The author believes that these policy interventions are necessary to have the maximum impact on the financial system to serve the needs of the regenerative economic system. For example, establishing a Capital investment review board would act as a regulatory body that will ensure that every investment in the economy meets the needs of the regeneration. Similarly, tax system reforms will help the government direct the money where it is needed. All Interventions are explained in detail in section 5 of this paper.

4.2 System Map for Regenerative Financial System

. In the following sections, I will describe the problem formation or vision, system dynamics through the causal loop diagrams, and leverage points compiled to form the overall map. The overall systems map equivalent to the Map 1.0 stage is shown in Appendix A.

4.3 Stock and Flow

The Whole Stock and Flow is divided into three main sections based on their importance in the financial and whole system. Their stock level needs to be monitored to anticipate systemic risk and draft economic policies. These are as below –

- Investment Chain
- Natural and Other Non-Financial Capital
- Bank Credit

These three stocks are explained below, along with the flows that go into them.

4.3.1 Investment Chain

The purpose of the map is to make the whole financial system regenerative.

Therefore, it is imperative to monitor the flow of financial capital from being created to the point of investment into different projects/options. Thus, I consider the flow of financial capital as the core variable having units of currency (USD, Pound, Euro, etc.). The core of this model is the stock and flow of this financial capital through the investment chain, with *Financial Capital Available for Investment* stock at the center, surrounded by different investment options. The whole investment chain stock and flow is divided into two main zones/sections— Real investment and Financial investment, which are further divided as shown below chart—

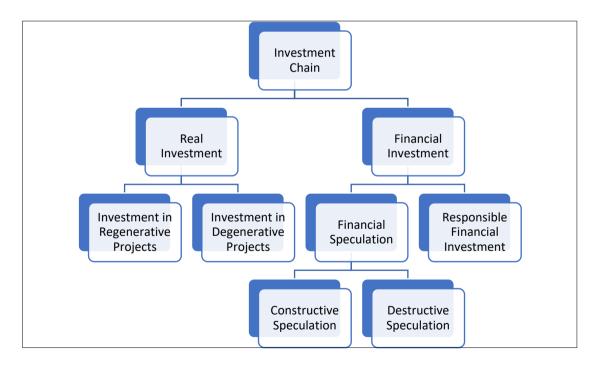


Figure 6: Chart showing the division of the Investment chain

The distinction between Real investment and Financial investment has been lost in modern finance. It is critical to keep these two separate to understand the direct

connection to qualitative concerns like Social and environmental issues (Fullerton, 2018a).

The capital invested in real investment causes the real economy to change consequently. For instance, building new houses changes the total no. of houses in the world. Also, it directly impacts the real economy as labor and material will be used while having some social and environmental consequences. In contrast, Financial investment in existing assets is not considered a new investment as no new employment or material is used. An example of financial investment is when an investor buys shares, it does not directly impact the real economy. However, it affects the cost of capital of the project. The financial investment can be responsible or extractive depending on the outcome (Fullerton, 2018a).

Real investment and Financial investment are further divided into sub-categories depending on the factors like the impact of the outcome of these investments, intention, and holding period.

Financial Capital Available for Investment could seek investment in two projects – Degenerative and Regenerative. They both are real investments; however, they differ in their outcomes. Regenerative projects are the ones that are aligned with the living systems principles or regenerative principles and have positive social and environmental impacts. In contrast, Degenerative projects are the ones that have negative social and environmental impacts. This model aims to maximize the stock of Financial Capital Invested in Regenerative Project, a core stock depicted with a red border and green color. The green color signifies that the purpose is to increase the stock. In contrast, Financial Capital Invested in Degenerative Project stock needs to be reduced and shown in pink.

Financial Capital Available for Investment could be engaged in financial investment other than these two projects. Here it is crucial to distinguish between Responsible financial investment and Financial speculation. There is no clear line drawn between these two. Both involve buying existing assets like Bonds, stocks, or already developed real estate. The distinction is primarily based on context and intention.

Responsible financial investment implies the investment portfolio includes the firm's Environmental, Social and Governance (ESG) characteristics and financial performance. The Author goes one step further. His criteria for responsible investment include responsibility like the one that comes with genuine ownership (Fullerton, 2018a). Voting proxies represent a merely part of responsibility, but genuine responsibility that comes with ownership requires regular engagement with senior management on strategic issues (Fullerton, 2018b).

Financial investment or speculation is further split into Constructive speculation and Destructive speculation depending on the time horizon of investment and trade volume. Both exist on a spectrum. At one end is Constructive speculation, which is like Warren buffet style investing, which has no intention to sell the stocks until their goals are met. Trade volumes are shallow for such investors as the time horizon is comparatively high. In comparison, Destructive Speculation or Extractive Speculation is purely transactional, including high-frequency trading with huge trade volumes. The time horizon of such speculation is typically a few seconds or minutes.

Financial capital from any source (we will look at the source later) enter the economy through *Financial Capital Availability Rate*. It then enters the *Financial Capital Available for Investment* stock. Different Flows like *Regenerative Project Investment*, *Constructive Speculation*, etc. drive the financial capital to the respective

stocks, as shown in figure 8. Investors keep shuffling their portfolios and divest from one to invest in another. Therefore, *Divestment* or *Disinvestment* rate drives the capital back to *Financial Capital Available for Investment* from different stocks.

Cloud shown in stock and flow like the one at the beginning of the investment chain shows the model's boundary. It means we don't consider anything before or beyond that point, depending on the location of the cloud. Dynamics of different feedback loops that drive these different flows that lead to the flow of Capital across this investment chain are explained in the System dynamics section.

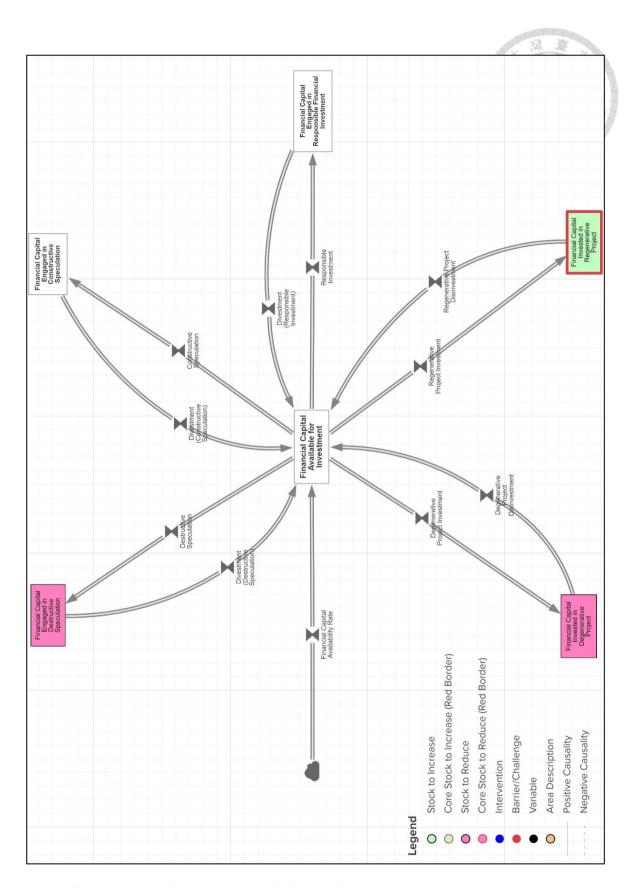


Figure 7: Investment chain showing all the possible investment options

4.3.2 Natural and Other Non-Financial Capital

Another stock and flow in this map is *Natural and Non-Financial Capital* which is necessary to integrate with the financial system. This combined Stock represents not only the Natural capital but other Non-financial capital like Social, Cultural, living, etc. The author considers Eight forms of Capital from Regenerative Enterprise (Roland & Landua, 2015), as shown in Figure 8.

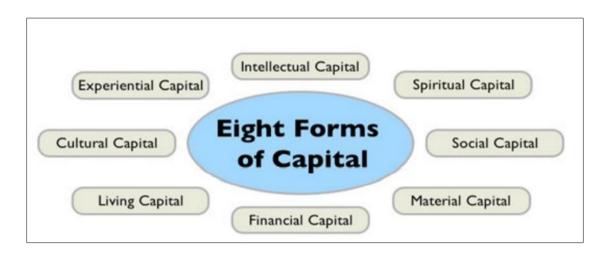


Figure 8: Eight forms of capital considered by the author in his theory

Source: Roland, E., & Landua, G. (2015). Regenerative enterprise: Optimizing for multi-capital abundance. Lulu Press, Inc.

However, non-financial capital is not limited to only these eight forms. Many other forms of capital are commonly used in the context of Sustainability. This *Natural and Non-Financial Capital* stock needs to be monitored as it provides the necessary Ecosystem services that are essential for the Human economy and sustaining life on the planet. This stock also represents a systemic risk in the form of Social and Environmental Risks—for example, Climate change. One of the reasons for climate change is the depletion of our natural resources that disturbs the balance of the ecosystem and severely impacts other systems. These impacts manifested in the system

as systemic risk. The *Renewal* and *Depletion* Rate is driven by the outcomes of the different investment decisions and Market dynamics that will be explained in later sections.

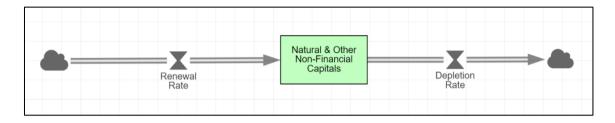


Figure 9: Natural and other Non-financial capital stock & flow

4.3.3 Credit Created by Banks

The last stock in this map is *Credit Created*. One of the critical functions of the financial system is to create credit, which is how capital is allocated to the economy. Knowing who is creating this credit and where it is being allocated is essential. Credit growth (also known by names like debt, debt contract, etc.) plays an essential role in the economic development of a nation; however, the same quality that makes them desirable also makes them dangerous, as seen in the 2008 financial crisis (Turner, 2016). Therefore, it is essential to keep track of the credit created. Credit Creation flow increases the *Credit Created* stock every time a creditor creates a loan to the borrower. In contrast, Credit Destruction flow will reduce the stock whenever the borrower repays its loan.

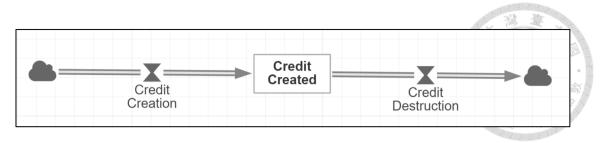


Figure 10: Credit Created stock and flow

4.4 System Dynamics

In this section, I will review the map's main features in depth, citing the literature supporting the claims. The goal is to build enough understanding of the processes that drive the system rather than providing a comprehensive review of all the regenerative finance theory.

4.4.1 Project Outcomes

The financial capital invested in Financial investment and Real investment stocks generates outcomes in the form of Financial returns, which plow back into the same investment to generate more profit. This forms the Reinforcing growth loops across all the investment options. Unlike Financial investment, Real investment directly impacts the *Natural and Non-Financial Capital* stock through the social and environmental consequences of the projects underlying respective investments.

Degenerative projects, as the name suggests, have *Negative Social and Environment Impacts* that deplete the *Natural and Non-Financial Capital* stock in contrast to Regenerative projects, which renew the stock through *Positive Social and Environmental Impacts*.

Financial investment does not directly impact the Natural stock except for Responsible Financial Investment, where the ESG lens is used to make decisions that lead to less depletion of Natural stock.

One exception in the natural stock is for Non-renewable resources that cannot be renewed within a human time frame. Regenerative projects don't invest in projects involving non-renewable resources like oil & gas that pollute the environment.

Therefore, investment in regenerative projects still positively impacts these resources as it reduces its depletion rate.

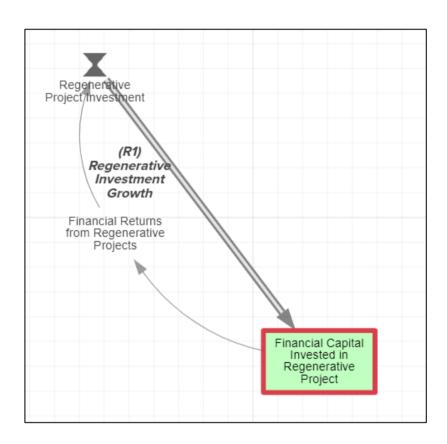


Figure 11: Regenerative Investment Growth Loop

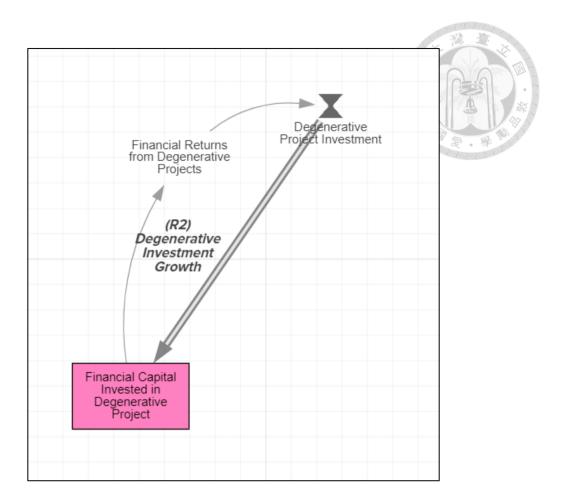


Figure 12: Degenerative Investment Growth Loop

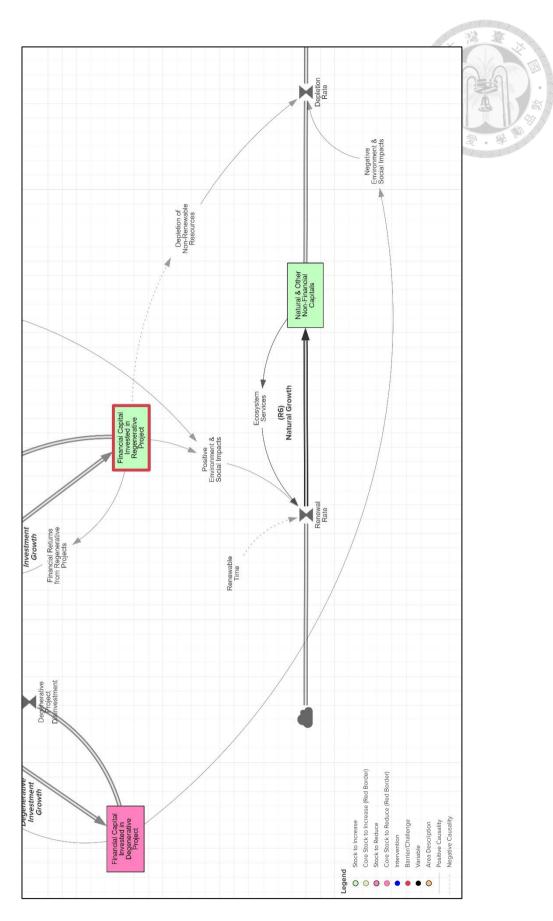


Figure 13: Positive and Negative outcome of the projects in real economy

Natural capital stock, also known by several other names like Biodiversity, has outcomes in the form of the necessary life-sustaining ecosystem services. These are the services that people gain from the ecosystem. Millennium Ecosystem Assessment (2005a) defined these services as provisioning services like water and food; regulating services like climate control, wastes, and floods; cultural services like recreational and spiritual benefits, and supporting services like photosynthesis and nutrient cycling. (Millennium ecosystem assessment, 2005). Biodiversity and ecosystem services are linked together as if they are the same. Some described the former as the foundation of the latter, or some described it as an enabler or regulator of ecosystem services (Díaz et al., 2006).

They provide goods and services critical to long-term well-being and future economic and social development (OECD, 2011). Hence, natural and non-financial capital stock feeds ecosystem services that further feed the renewal rate forming a Natural growth reinforcing loop.

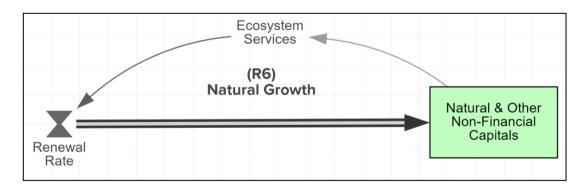


Figure 14: Natural Growth reinforcing loop

4.4.2 Basic Economic Value Creation

This section represents how the financial capital created in the economy circulated back into the system. The Financial Capital invested in Degenerative and

Regenerative Projects creates *Employment* to execute those projects, further feeding *Household Income* for the employees. A part of that Household income goes into *Household Savings* that feeds back into the system since savings either goes into investment in a personal capacity or into Bank savings eventually credited by Bank.

Both degenerative and regenerative projects create employment, but we aim to generate more employment from greener sources as it generates positive social and environmental impacts. The reinforcing loop with Regenerative projects is not shown here for simplicity.

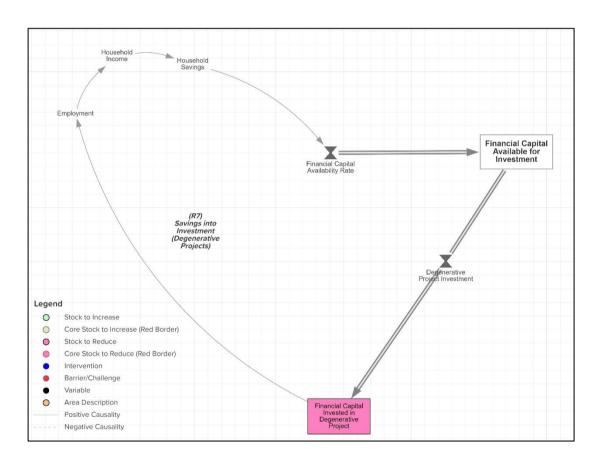


Figure 15: Savings into investment reinforcing loop

An increase in Household income further fuel *Household Spending* that led business to generate Revenue and hence profit assuming other things constant. Business

Profit boosts investment in the economy. Thus, more capital is available for investment—this completes the Business Revenue Cycle loop.

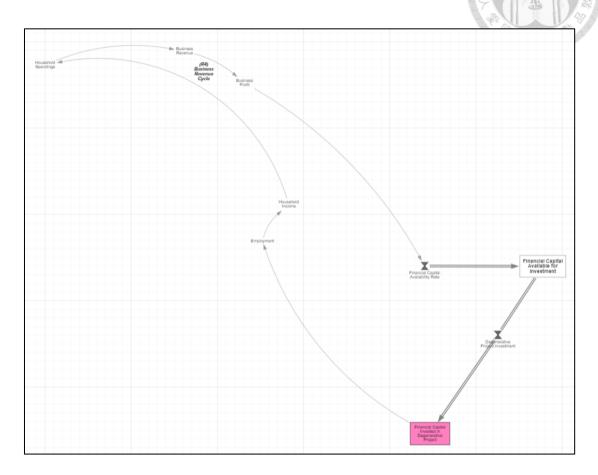


Figure 16: Business Revenue Cycle reinforcing loop

Looking at the macro level, we have efficiently converted our natural resources, mainly fossil fuels, and growing human capital in the past century into financial capital. This is the direct result of the extractive capitalist system. However, it comes at the cost of damage to the ecological system and social inequality(Fullerton, 2018b).

Even today, all financial assets have their basis in natural resources. These natural resources are converted into built capital with economic value in the market.

Built capital or human-made capital is the processed raw material created by humans like tools, factories, other technologies, etc. The economic value of this available built

capital becomes the basis of the financial capital invested in the economy. Later, depending on the quality of the investment will decide its depletion rate.

Central Bank controls the Money Creation

The central bank is mandated to provide financial and macroeconomic stability through monetary policy. Central Bank regulates the creation of money through the pricing mechanism, i.e., controlling the short-term interest rate. Whenever excessive credit growth leads to inflation risk, the central bank controls the supply of money in the economy by increasing the Interest rate. Similarly, whenever investment growth is needed, the Central bank lowers the interest rate, which raises the credit creation rate, and Bank creates more credit.

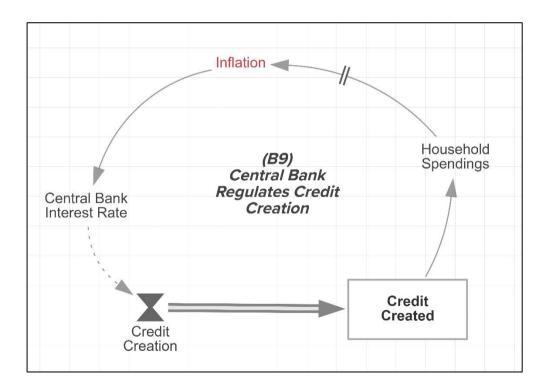


Figure 17: Central bank regulates the credit creation balancing loop

4.4.3 Allocation of Credit

If the monetary policy is the ultimate limit on credit creation, then the next immediate question arises: who creates the money in the economy? There is a widespread misconception that banks loan out their deposits. This is an incorrect understanding of money creation. According to one report from the Bank of England published in their quarterly bulletin in 2014, "Whenever a bank makes a loan, it simultaneously creates a matching deposit in the borrower's bank account, thereby creating new money." (Michael McLeay, 2014 Q1). In the modern economy, those bank deposits are mainly created by commercial banks themselves. Almost 97% of the money supply is provided by private banks. Unlike western countries, some countries' Banking sector is run by Private or Public banks; however, the idea of creating money remains the same. This leads to one of the conclusions that almost all credit created in the economy is available for investment. This is depicted as a connection between the credit and investment chains.

Allocation of the money to productive real economy is vital for the economy's sustainability. Credit creators would hugely influence capital allocation, and most likely, it will flow in the direction most beneficial to them. Credit creation is intrinsically tied to profit-oriented lending by private or commercialized banks (Doorman, 2015). Since bank managers are also victims of shareholder value ideology, they strive to lend money in activities that maximize profit in the short term. Therefore, the majority portion of this credit goes to the leverage capital, i.e., engaged in the speculation.

This forms a reinforcing feedback loop as credit created leads to more leverage in the economy. This leads to more profit in the short run as leverage capital invested in

the economy for a short span of time. More profit incentivizes banks to lend more money to such activities.

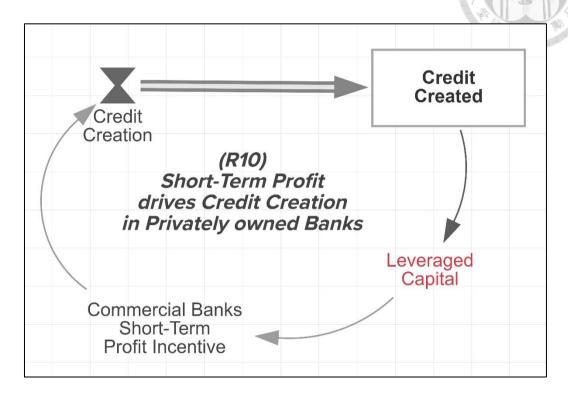


Figure 18: Short-term profit drives Credit Creation in private banks

4.4.3.1 Credit allocation leads to the continued success of non-bank financial institutions - Success to the Successful archetype

One of the benefits of systems mapping is that it makes recurrent patterns explicit. In systemic terms, we call it Archetypes. Archetypes are the recurring patterns of behavior that give insights into the structures that drive systems. The archetype's value is that it unfolds the underlying structure, which helps predict that system's future behavior (Kim, n.d.).

In the Banking system, Bankers are directing the credit into unproductive activities. such as financing leveraged buyout deals and lending to hedge fund speculators. These are the big non-bank financial institutions like Private equity firms or

hedge funds, which leveraged the credit to speculate in the capital market and generate huge returns.

These big institutions have the advantage of having expertise in finance, more information than other people, and advanced tools to analyze, which led them to take advantage of market conditions. Therefore, they could generate substantial short-term profits that appear more lucrative to bankers than conventional lending.

Once more credit is allocated to these big non-bank financial institutions, they will be able to generate more profit, putting them in a better position to get more allocation and increasing the likelihood of continued success. This leads to less credit available for "less profitable" local and small productive businesses knowing that they are productive and essential to the real economy (Fullerton, 2018b). That further reduces their returns and makes it appear less lucrative to banks for lending. Hence, it further reinforces the lending to these big financial institutions. Such structure is known as "Success to the Successful" as the initial lending to non-bank financial institutions leads to their continued success while reducing the credit to other vital productive businesses.

In this case, initial lending to big non-bank financial institutions is motivated by short-term incentives in the private banks, as seen in the above section.

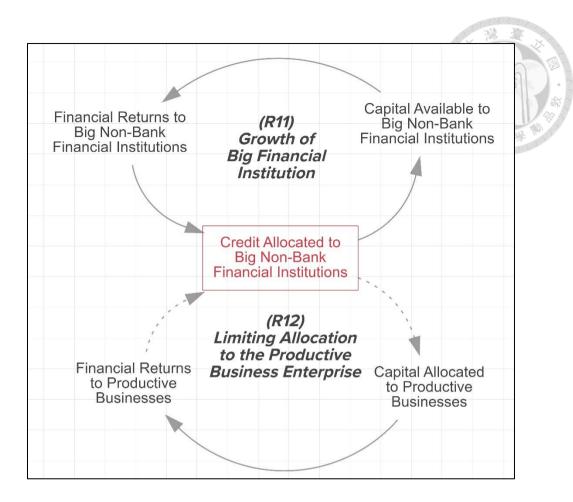


Figure 19: Success to the Successful archetype

4.4.3.2 Regulations penalize real economy - Fixes that Backfire archetype

One of the consequences of allocating less capital to productive businesses is that it deteriorates the long-term relationship between banks and businesses. They used to share a symbiotic relationship where both enjoyed a long-term credit relationship. However, banks now find the transaction-oriented relationship with the leverage industry more rewarding. This reduces the banking system's resilience. The more diverse the business banks lend to, the more resilient it will be.

Nevertheless, they prefer to focus on increasing their profit in the short-term rather than long-term resilience. Banking resilience directly affects the Financial system

resilience as the banking sector constitutes the most significant part of the financial system. Hence positive causality is shown in the map.

To protect the banks during the crisis, Regulators implement a Liquidity and Capital constraint that acts like a buffer system. A certain amount of capital and liquidity is mandatory for the bankers to maintain on their balance sheet all the time. Banks can utilize this capital buffer during the crisis, saving them from bankruptcy. This is a quick fix to increase resilience.

This quick fix has an unintended consequence that eventually weakens the banking resilience. Liquidity and capital constraints by regulators mean banks need to maintain certain liquid assets and capital in the short term. This pushes them to rely on lending money to leverage the speculations to get money in the short run. Thus, reducing the credit to small businesses and eventually reducing the banking system's resilience.

This is another generic structure that is very common. It is known by a different name in the systems community, like Fixes that fail or Fixes that backfire archetype. It is depicted by a balancing loop "Strengthening Banking Resilience," and Reinforcing loop "Regulations Penalize Real Economy" on the map. The story goes like this, a quick solution rather than fundamental solution is implemented to solve the issue. This might solve the problem for a while however, its unintended consequences cause the problem to return or even make it worse.

Another exciting aspect of this archetype is that the regulator's intentions to fix the resilience align with the Private banks' goals of earning profits in the short term.

This way, regulars are pleased to see the banks maintaining the capital constraints while, at the same time, banks can continue with their short-term lending practice.

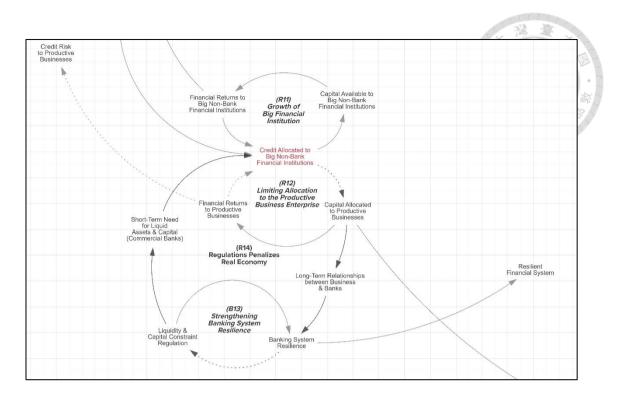


Figure 20: Fixes that backfire archetype - Regulations penalize real economy

4.4.4 Financial Leverage optimizes efficiency

In this section, I will cover how the credit allocated to big non-bank financial institutions is used for speculations and in leverage buyout industry.

In leverage buyout industry like Private Equity (PE) firms, Short term incentives drive their decision making. They explore possibilities to extract financial value from the poorly managed enterprises in the short-term. This short-term decision-making lead to more *Leverage Buyout Deals* that further increase Firm managers' incentives. The cycle continues as shown in the reinforcing loop in Figure 21.

There are two incentives for Firm managers working in the leverage buyout industry- Compensation and fear of losing jobs. This industry is highly competitive and offers a huge compensation for the managers. If managers cannot generate profit in a short term then they will be replaced by someone who could. Moreover, their

compensation is linked with their performance. So, they strive to have more deals in short term to earn huge income.

As these deals are financed by huge debt from the banks, it leads to more leverage in the economy hence, *Leverage Buyout Deals* feeding *Leverage Capital*. The modus operandi of these firms is that they buy companies, fix them and then sell them. The result is extracting the financial value and most likely leaving the company in a degenerative state with negative social and environmental impacts. Thus, *Leveraged Buyout Deals* feeding the *Degenerative Project Investment*.

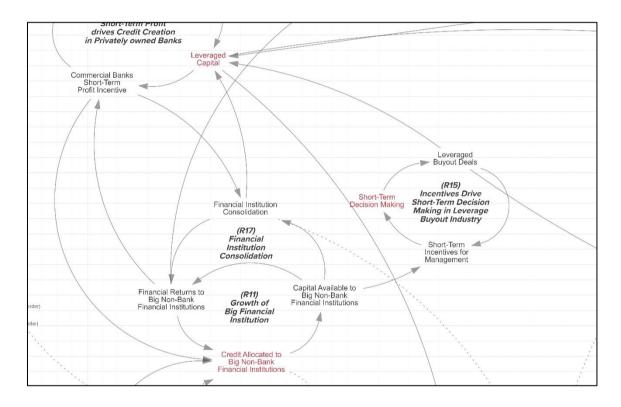


Figure 21: Incentives drive short-term decision making in leverage buyout industry

Similarly, Hedge funds use leverage capital to hedge risks in the capital market.

Their transaction time horizon is shorter than PE firms while functioning is similar.

They take advantage of their enormous cash and debt and their financial expertise to

hedge risk in market. In return, they get huge speculative profit hence more financial leverage.

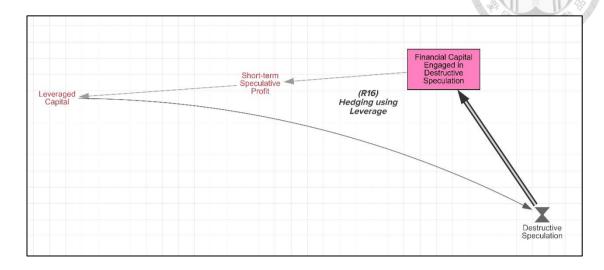


Figure 22: Hedge funds leverage to speculate in market

4.4.5 Financial Institution Consolidation

Many factors are attributed to the Mergers and Acquisition (M&A) in the financial industry in USA that include both banking and non-bank financial institutions. The main motivation behind consolidation is maximizing shareholder value, executive compensation and technological progress (Berger et al., 1999). Shareholder value is achieved through increased market power or improved efficiency after consolidation. Whereas managers tend to engage in more M&As for their short-term profits as their compensation usually grows with firm size. Technological progress contributes by increasing the scale economies in producing services and create opportunities.

Financial crisis and recessions are also major cause of consolidations. It is evident from the recent 2008 financial crisis where total number of banks in US fell by almost 12% post crisis and total US deposits held by 10 biggest commercial banks rose from 44% to 49% (Wheelock, 2011). This is because big institutions have more money

power. They take advantage of the crisis to buy small firms when they are struggling and consolidate to increase their political power.

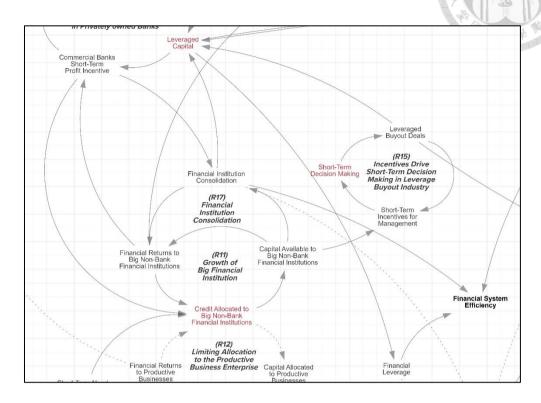


Figure 23: Financial Institution (Bank & Non-Bank) consolidation loop

There is a direct and indirect consequence of consolidation. Direct include increased market power of the surviving institution which allow them to increase profits by setting prices unfavorable to customers and getting favorable responses from the government. Indirect consequences would be less financial services available to small customers. (Berger et al., 1999) This result in more credit allocation to big non-bank financial institutions that will speculate in the market to earn more profit. Concentration increases the efficiency of these institutions, which means higher return in the short-term and less resilient.

4.5 Speculation

4.5.1 Speculation reinforces short-termism

Now that we have seen that most of the credit is engaged in the speculation through various medium, let's understand the cause and cost of speculation and how it affects the real economy.

According to the survey conducted by Mckinsey in late 2015, 65% of all respondents, who are C-level executives and board members, report that pressure to deliver short-term results has increased in last 5 years (Barton et al., 2016). This impact inversely on the long-term investment. Many experts believe that weak investment is associated with the rise of Short-termism. Short-termism or Quarterly Capitalism focuses on short time horizon, prioritizing near-term shareholder interest rather than long-term growth of the firm (Davis, 2009).

Increase engagement of financial capital in destructive speculation leads to the volatility in the firm valuation. This compel the managers to chase the short-term earnings to mitigate the volatility. Managing short-term earnings have negative causality with Long-term value potential of the company. This long-term value is in both financial returns and Environmental impact. Reduction in long-term value potential leads to lesser long-term investors, increasing the ratio of Traders compared to long-term investors. This reinforces the destructive speculation and closed the vicious loop.

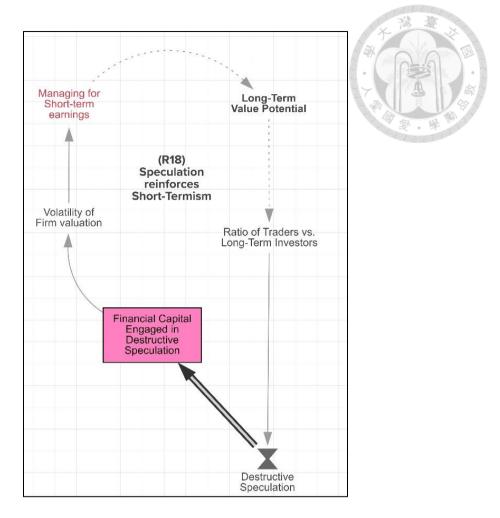


Figure 24: Speculation reinforces short-termism

The above loop is from the management perspective. From the investor's perspective, investors are also looking for returns in the short-term. This is partially due to their short-sightedness and partially due to the market's short-termism.

As a result, the absence of long-term investors in big multi-national organizations leads to the absence of responsibility to govern hence, lack of genuine ownership (Fullerton, 2018b). Lack of genuine ownership prevent long-term planning. This further cause reduction in the productive investment decisions which undermines the long-term value potential as shown in figure 25.

4.5.2 Additional drivers of Short-Termism

i. Optimization of Shareholder Value

Managers are the victims of shareholder value theory as their job is to maximize the shareholder value hence, they strive to maximize the shareholder value in response to the demands of the speculator- dominated market. As a result, they manage for short-term earnings.

ii. Limited Liability Structure

Lack of genuine ownership is further reinforced by the limited liability structure of the public corporations. This structure protects the owners against personal liability irrespective of the company performance. This translates to the lack of genuine ownership in contrast to the family-owned business (Fullerton, 2018b).

iii. Compensation Incentive

The current compensation structure of the executives also fuels short-termism. The compensation structure is based on short-term metrics and incentivizes short-term executive behavior. For instance, CEOs and other executives are paid in stocks hence they are incentivized to do only one thing i.e. to raise the stock performance in short-term.

iv. Technological innovation

Much of the destructive speculation is escalated by technological innovations like Artificial Intelligence (AI), which give rise to Hi-frequency computer trading.

v. Number of Stock exchanges

As the number of stock exchanges grows, the information is processed faster.

That lead to more volatility in the market and hence increased speculation. This is also

in line with the market demand supply cycle. As speculation grows, supply of stock exchanges rise.

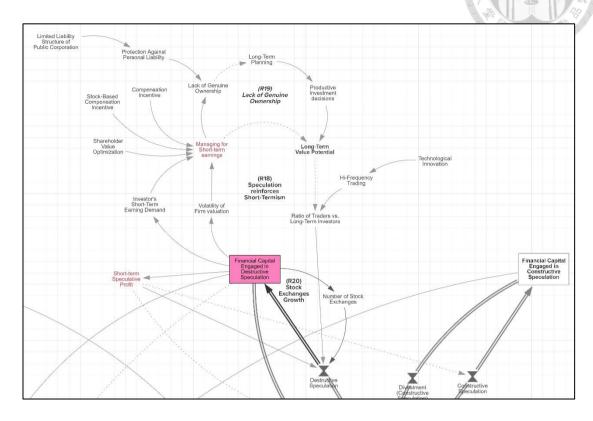


Figure 25: Additional drivers contributing to short-termism

Several drivers drive the investors away from the destructive speculation towards the constructive speculation or responsible financial investment.

First is the holding period. It is also the basis of the division. Higher the holding period of the investment, higher investment in constructive speculation. One advantage of more capital in constructive speculation is it reduces the volatility in the firm valuation as flow of information and trading are not that frequent.

Second is the ESG transparency. As investors demand transparency around ESG issues, firm manages manage them to remain in the market. This cause more ESG based decision making by investors, forming a reinforcing loop where ESG transparency

drives decision making. As ESG issues factors in, investors and firm managers would divest from destructive speculation and invest more in Responsible financial investment. This sounds promising in theory but is simply seen as a smart investing and mitigation tool. It will not lead to any systemic change required at a given scale and timeframe (Fullerton, 2018c).

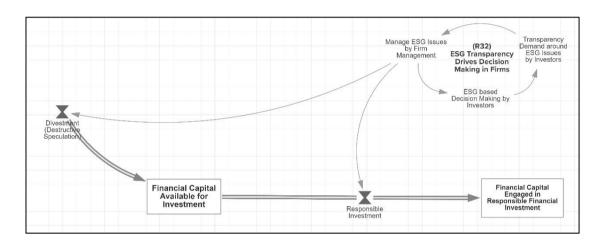


Figure 26: ESG transparency drives decision making in firms

4.5.3 Reliance on GDP to measure Economic Growth for prosperity

Gross Domestic Product (GDP) has been a widely acknowledged metric to measure country's economic success for more than half century. GDP is a monetary measure of market throughput that adds up the value of all final goods and services produced in a specific period. However, it doesn't include many important activities such as social capital formation, Voluntary work, and depletion of natural resources (Costanza et al., 2009). It was originally designed to measure the raw economic activity instead of complete economic progress. Even Simon Kuznets who introduced it in 1934 cautioned against its use as a measure of social well-being. Regardless, undifferentiated economic growth is perceived as greater societal prosperity today. GDP has been used as only one means which is now confused as an end in itself (Fullerton, 2018b).

The issue with over-reliance on GDP is its role in policy formulation and prioritization. Different policies and goals would emerge if poverty rates, inequality levels, natural capital accounting etc. were weighted as heavy as GDP. Instead we focus on increasing GDP even though many socioeconomic indices reveal that we are experiencing growth without progress (Cha, 2013).

Finance and capital market add another layer of confusion of means and end. As per Finance narrative, financial capital is required to seek highest risk-adjusted return on investment regardless of their qualitative aspects. It continues that this increased risk-adjusted financial return implies more effective capital allocation, which promotes economic growth and, ultimately, societal prosperity. This is based on the reductionist mindset that does not consider specific investment's risk to the economy, society or environment. Prime example of such thinking can be found in the Cost-benefit analysis of Nobel laureate William Nordhaus. He concluded that it is preferable to ignore climate change than to negatively affect GDP growth (Murphy, 2018).

Financial capital invested in real economy drives the GDP growth. The contribution of degenerative projects in driving GDP is much higher than Regenerative projects as the scale of the former is larger than latter in the current times. Increased GDP growth is perceived as greater societal prosperity. This perception further led to the investment in degenerative project as the decision are based on the higher risk-adjusted return. This completes a reinforcing loop that signifies our over-reliance on GDP growth due to the confusion of means and ends.

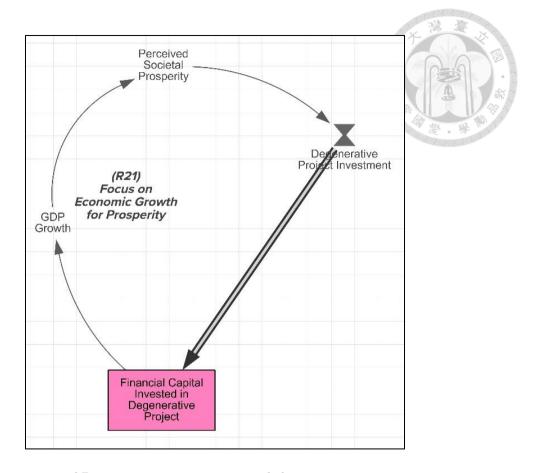


Figure 27: Focus on Economic growth for prosperity

4.6 Limits of Free Market

At the core of the finance ideology and neoliberal economics paradigm is a premise that market solutions should always be supreme over a government role. The binary framing that either free market is best to solve all issues or markets always require government involvement is a false choice (Fullerton, 2018b).

Markets are tools that can be effective or ineffective in certain conditions within the context of regenerative vitality. In this section, I will highlight the limitations of markets where it is a wrong tool. In all these cases, promoting free market as an only alternative to government regulation could be dangerous for society.

4.6.1 Market Completion or Financialization of the Economy

It is a concept that if more economic activities are added to the efficient financial markets, capital will be allocated more effectively, increasing the economic growth rate. This is again on the presumption that higher growth rate leads to greater human prosperity. This forms a reinforcing loop where economists suggest the financialization of economy.to drive growth.

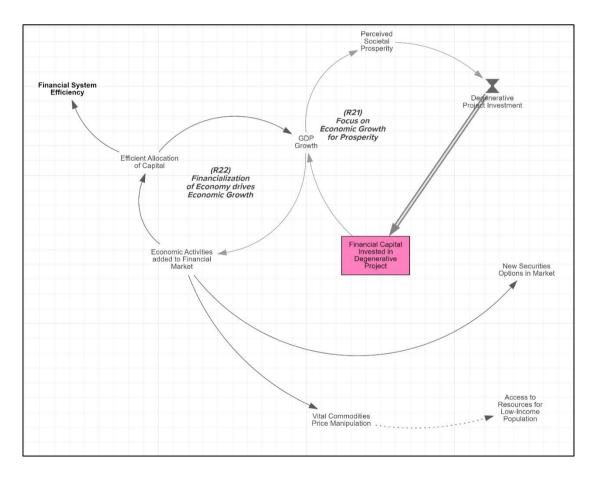


Figure 28: Financialization of the economy to drive economic growth

Complete market is the one where there is a market for every asset in every possible state of the world. Therefore, adding more economic activities to financial markets led to the explosion of trading in derivates and new securities options. These

new securities led to the increase in traders that further drive destructive speculation as shown on the map.

Another consequence of market completion is the manipulation of vital commodities including food. When commodities become an asset class and traded, it become a part of many investment portfolios. The price of these vital commodities is influenced by tremendous speculative capital that consequently reduces the access of these resources to low-income populations.

There are other instances where market is a wrong tool and we use them as an effective tool. Let's consider how market normally works and is represented by demand and supply cycle on the map. Efficient price discovery is the central function of market. It enables willing buyers and sellers to match supply with demand. When a price set by the market rises, more supply will follow, bringing the prices back to equilibrium. Similarly, when prices plunge, demand increases that balances the prices. Therefore, prices are set when demand and supply are in equilibrium.

People with resources to pay for their "wants" can afford at market prices.

However, people with low-income who doesn't have means to secure their needs, cannot be handled by market hence wrong tool which is represented by the negative causality from market determined prices to Access to resources for low-income population. Social entrepreneurs, government subsidies, and philanthropic institutions aid to reach the bottom of the pyramid and mitigate market limitations.

Another limitation is the misalignment of interest in market-based solution and society's desire. The businesses can manipulate demand in market. Every business wants their service demand increased due to their profit incentive. So, they spend money on advertising to persuade customers to try their service. Increase in advertisement

budget usually translates to increase in the demand. More demand gives more incentive to business to maximize their profit. This forms another reinforcing loop where profit incentives drive the demand. However, this is not always aligned with what is best for society. For instance, cosmetic products. Companies create creative advertisements to persuade customers to use their product, which usually increases demand. However, this is not in society's best interest as it may cause inequality. Therefore, simple market tools alone cannot address complex problems like healthcare.

4.6.2 Externalities

An externality is the indirect effect on society caused by members in a commercial activity or transaction that is not represented in the price of the goods or service. It can be positive or negative. A business that causes pollution that diminishes the value of property and health of people in the community is an example of negative externality whereas a company that discovers a new drug benefits whole society is a positive externality.

Government put indirect taxes on a private transaction to internalize externalities. Pricing in externalities raises the cost of the product, further reflected in market prices. Increased market prices trigger innovation for cheaper alternative supply of goods and services but that often comes with a delay depending on many factors like R&D investment, policy environment etc. This alternative reduces the demand for the old product. For example, Carbon tax to capture the cost of pollution that raises the price of energy from fossil fuel. This compels the people to use green energy. This is all good in theory however, it is often more complicated.

The above example can work well if the effect is clear and solution is known with a price. However, in cases where effects may not be clear, solutions are not clear

with a known price, or where there is no price for the rectification, the invisible hand of a free market failed to handle such situation. Hence market is a wrong tool.

Market is not always an effective tool to provide solutions in a required timescale that is appropriate in a situation. Consider an example of Climate change crisis. If market was effective enough or even if we leave it on market forces for solution, we will likely pass the time frame to stop the catastrophic effects of climate change as scientists suggested.

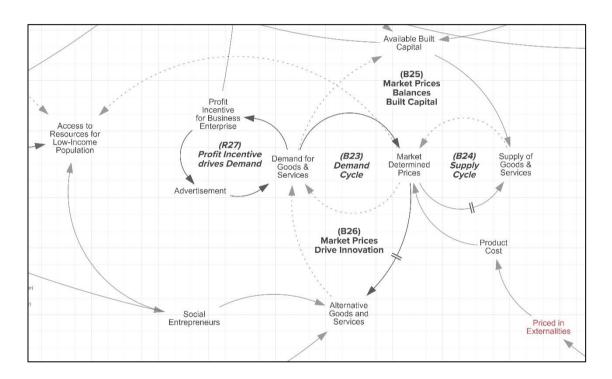


Figure 29: Dynamics depicting the limits of market

4.6.3 Stranded Assets

Limitation of markets is most apparent in case of Stranded assets. Stranded assets have become non-performing prior to their economic life due to the changes in market and regulatory conditions related to the transition to low-carbon economy (Caldecott, 2018; Tracker, 2017). In this section, assets under consideration are mainly

the fossil fuels reserves which carry the risk to both financial markets and climate change.

In 2011, Carbon tracker popularized the carbon bubble concept through their report "Unburnable Carbon: Are the World's Financial Markets Carrying a Carbon Bubble?" (Tracker, 2011). The report highlighted the financial market risk and was based on the carbon budget which is the amount of emissions that can be released in the atmosphere before reaching some warming threshold. The main highlight of the report was that to keep the global warming below 2 degrees Celsius, then sizable bulk of existing reserve need to be left in the ground i.e. stranded. These reserve bases are the bases for valuation of fossil fuel companies in market. Writing-off these valuation/assets could collapse the market as it is estimated to be around \$25 trillion. However, little or nothing have been done by fossil fuel companies or by market.

There is an ever-greater environmental and social risk other than financial risk to the market. There will be unprecedented runway climate change consequences if we ran out of our climate budget. Some of which are already manifested in the form of draught, floods, hurricanes, etc., in various parts of the world. The carbon budget estimate was first published in 2009 in the peer reviewed report from Potsdam Institute. Now it's already 2022 and the target has been lowered to 1.5 degrees Celsius.

Markets failed to consider discounting any of this risk and deal with a decision to write-off \$25 trillion of economic value without causing failed states.

4.6.3.1 Escalation Archetype

The issue of stranded assets is so complex that any action would quickly escalate to spiral of destruction. If the proved reserves of fossil fuel companies were started to declare stranded assets, then fossil fuel companies will begin losing their market

valuation. This will send negative signal to the market and cause a huge risk to the financial system. Therefore, to prevent such financial crisis, fossil fuel companies reserves will not be declared stranded assets. This completes a balancing loop "Threat to Financial Market".

Moreover, Carbon tracker estimated that publicly traded companies owned 24% of global fossil fuel reserves. This implies that 76% of these reserves are with sovereign states like some Petro states like Saudi Arabia, Russia etc. If these assets were asserted stranded, it leads to the collapse of these Petro-states economies. That will have social and political unrest leading to natural and non-financial capital depletion.

On the contrary, if these reserve bases were not declared stranded assets, burning these fossil fuels will cause a negative environment and social impact. This would result in the depletion of our natural and other non-financial capital that further accelerate the climate change damaging the earth's vital ecosystem. Therefore, to mitigate severe climate change consequences, proved reserves will be started to declare stranded assets. This forms another balancing loop "Threat to Environment".

Looking at above dynamics collectively, each side attempts to manage their threat however, action from each side turn out to be threat to other side. Meanwhile, the risk gets amplified over time. Such pattern of behavior is known as Escalation archetype. The challenge in escalation situation is to find means to change the pattern. Since markets alone cannot deal with such situation, we probably need a compensation and economic redevelopment regime to compensate for the market valuation loss. This will mitigate the risk to the financial system and could save Petro states from collapsing.

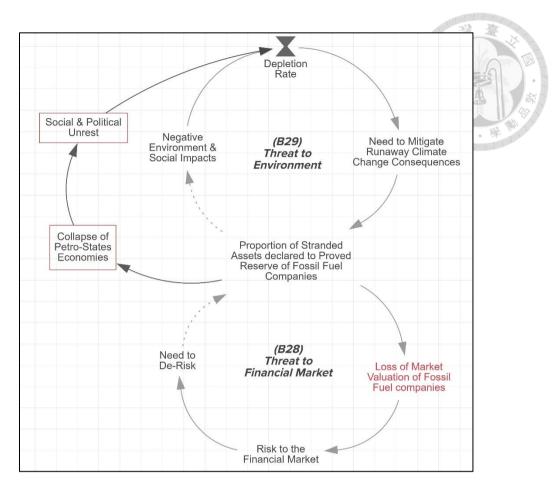


Figure 30: Escalation archetype depicting the issue of stranded assets

4.7 Limits to Investment

Donella meadows et al. first introduced the idea of "Limits to growth" in their book published in 1972. The authors investigated the potential effects of population expansion, human activities, and their physical implications on our finite world from system perspective. The study concluded it is impossible to have an infinite growth on this finite planet. Humanity cannot continue to use natural resources and generate wastes than nature carrying capacity of the planet. If human ecological footprint overshoots the carrying capacity then human economy will collapse.

The same planetary boundaries that puts limits to growth imply limits to investment as real investment drives growth. Thus, pursuing the exponential growth of

financial capital would lead to ecological overshoot. This is evident from the fact that out of the 20 largest countries equivalent to 3/4th of global GDP, all suffered losses in their natural capital per capita stock except Japan between 1990 and 2008 (United Nations Environment Programme, 2012).

Limits to Investment is important to understand the underlying risk in terms of financial and Ecological overshoot. Financial overshoot is the phenomenon where capital markets value financial assets much beyond sustainable limits in line with limits to growth. Every financial asset value is based on the underlying assets, eventually linked to the Biosphere supply of natural resources. So, if financial asset values are beyond the biosphere's carrying capacity, it is financial overshoot.

This is exactly the case. Many new realities should be discounted into financial asset valuations. For instance, Stranded assets, externalities and other off-balance sheet liabilities, etc., will cause loss of valuation and risk to the financial market when discounted. This would trigger unprecedented economic and social challenges. The housing bubble of 2008 financial crisis is just small example.

If financial overshoot is a reality and financial asset values are not discounted, it will lead to ecological overshoot. Ecological overshoot occurs when demand on nature exceeds its regenerative capacity. As a result, natural capital will deplete over period causing unprecedented climate change consequences which we are witnessing already.

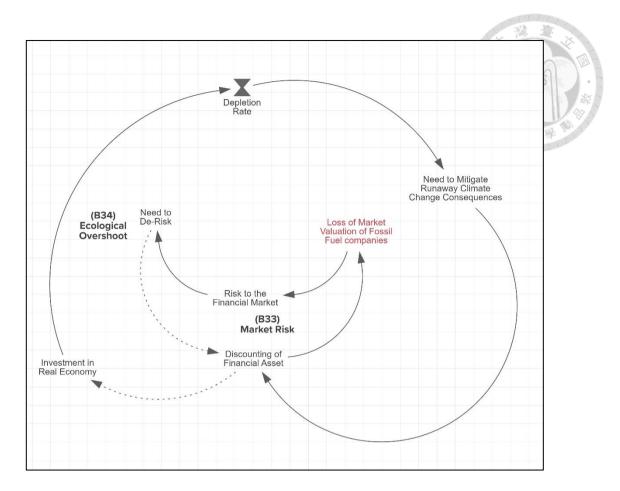


Figure 31: Limit to Investment

4.8 Government role in the system

In simple terms, Government responsibility is to protect and promote the welfare of its citizen. The role of government varies based on the type of the economy. United States is a market economy where government interventions are restricted and decisions are made by free market. However, government still play significant role of promoting stabilization and growth of economy. It attempts to maintain the steady growth while stabilizing prices and high employment rate. Its fiscal and monetary policy can slow down or speed up the economic growth affecting prices and employment.

Government also provides public goods and services like education, highways, military etc. These are paid for with the tax revenue collected from individuals and

businesses. The public sector is as important as the private sector to regenerate the economy. Therefore, public investment priorities greatly influence the economy's regenerative quality.

Large portion of the US government expenditure is spent on the subsidies to the degenerative activities like Fossil fuel, military expenditure and federal housing subsidies etc. In contrast, we need investment in new green technology, education, healthcare, etc., that makes the individual and planet healthy.

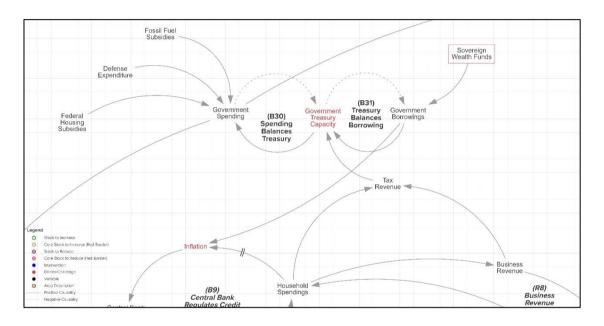


Figure 32: Government roles in the system

5 Leverage Point Analysis

Till now, the system map above exhibits the problem landscape. In the following section, I will propose some interventions expected to have a huge impact and take the financial system towards the regenerative phase.

Post the Financial crisis of 2008; significant policy reforms were enacted, like the Dodd-Frank Wall Street Reform and Consumer Protection Act passed in the USA, the Basel III reforms, and many more. Many of these reforms were effective and productive but were accompanied by unintended consequences. These reforms were reactive responses and lacked the vision for prosperity (Fullerton, 2018d). This is where policy reforms proposed by the author differ from the earlier one.

Legendary System Scientist Donella Meadows wrote "The most important phase of policy making process is vision. Great progress will not matter much if we don't know where we want to go" (Meadows, 1994). The Author also designed the policy framework for financial reforms considering his vision of a global network of place sourced, interconnected and interdependent regenerative real economies (Fullerton, 2018d). In other words, a financial system in service to a regenerative economy that works for people and the planet, this regenerative economy vision is steered by eight principles taken from our understanding of living system design covered in section 2.1.

The comprehensive 10-point policy reform proposed for the United States can be adapted to other countries. These are as follows –

5.1 Curtail Speculation

The purpose of curtailing excess speculation is to encourage capital flow into the real economy, particularly into projects aligned with the regenerative economy principles. Accordingly, significant disincentives can be implemented.

A combination of *Financial Transaction Tax* (FTT) and revised *Capital Gain Tax* (CGT) must be implemented to significantly reduce short-term speculative activities and profits. FTT will decrease Hi-frequency trading and penalize the short-term speculative profit while increasing the tax revenue for the government. An exception can be given to the market-making activities that genuinely serve the system.

CGT will be implemented depending on the holding period. Higher the holding period, the lesser the CGT, and the lesser the holding period, the higher the CGT. Thus, reduced CGT for Long-term investments and higher for short-term speculation.

An additional *Windfall Profit Tax* (WPT) above a certain threshold could be implemented to limit the high-risk speculation further. This will be crucial to enhance systemic health as it eradicates the large-scale, high-risk speculation.

Moreover, Tax break incentives should be given for Socially Vital projects, such as Green energy infrastructure, health care services for low-income people. This will allow the capital to flow towards regenerative projects while discouraging speculation and investment in degenerative projects.

These policy shifts would be destructive to the big financial institutions profit margins like investment banks, hedge funds. Trading volumes would shrink, and much of the speculation would be uneconomic. That would shrink the whole finance center and ancillary services that support them. However, a thoughtful implementation plan and extended transition period would be necessary to mitigate such drastic adjustments.

5.2 Reduce Leverage

Financial leverage in the system increases efficiency at the cost of resiliency, undermining the system's systemic health, as seen in the previous section. The purpose is to reduce the leverage to put the financial system in balance, making the economic

system more resilient. This can be achieved by eliminating the subsidies that led to the rise in leverage.

Limiting the size of the mortgage will have a profound impact on the leverage.

Thus, subsidies on the mortgage interest deduction should be limited to only first-time homeowners. It should not be given for second home ownership. Further such subsidies should vary by geography due to the varying housing cost.

The following intervention is to raise the cost of debt capital used by the leverage industry. One way is the elimination of Interest deduction incentives for speculation. This will limit the profits from speculation as their interest expense deduction will not be subsidized. Another is the interest deduction incentives that favor debt capital over equity capital must be restricted. An exception shall be given to small businesses with limited equity capital access. In addition, the debt limit relative to the company's free cash flow has become crucial to curb excess leverage.

Other than eliminating subsidies, any subsidies on regenerative real estate projects like green real estate, public and affordable space, etc. should be encouraged.

5.3 Regulate for Fractal Structure

Effective circulatory systems are built in fractal patterns, such as a tree's root and branch system. Fractal structures guarantees that vital resources reach all extremities of the system efficiently while also allowing all system components to contribute to the health of the whole. As moving to the higher-level system, entities are inclined to serve the whole system rather than extracting for themselves. They understand that their health depends entirely on the whole system's health. For instance, the main arteries in the human cardiovascular system. They help in circulating the vital blood to all the

different systems of the body to maintain the overall human body. Likewise, regulators should regulate the fractal structure and function in the financial system.

In the financial system, this implies promoting small and mid-sized financial intermediaries that serve the real economy while confining the extractive power of big financial institutions. One may argue that anti-trust laws are designed precisely to do this. However, it doesn't curb extraction when enforced other than being reactive in comparison to fractal structure, which is proactive.

Pricing control could be an efficient tool to regulate the fractal structure. Hence, Stringent Capital Surcharges on Large Extractive Institutions (Banks and Non-bank financial institutions) would compel them to split into smaller, focused establishments to gain preferred status. It could be complemented with tax incentives such as capital gains holidays for funds investing in underinvested communities. This boost the flow of investment deeper into real investment.

5.4 Prioritize Business Formation

New innovative and social enterprises are essential to meet the needs of communities where capital doesn't naturally flow. Capital usually flows in the direction of maximum risk-adjusted return hence in large existing assets. Therefore, we need policies that incentivize and subsidize business formation and critical infrastructure projects, which are essential for the regenerative economic system.

One such example is Small Business Administration (SBA) in USA that has several such programs. They should be expanded to other regions to revive each regional economy. It will be complemented with the capital gain holiday encouraging capital to flow in such investments.

5.5 Reform Tax System

The tax system can eradicate the surpluses that cause inequalities in society and internalize the externalities that usually don't reflect in the pricing system. First is the *Pigouvian Taxes*. It is a tax on economic activities that generate negative externalities. A carbon tax is an example of a Pigouvian tax. It shifts the cost from society to the "bad" that produces these externalities. It is necessary to mention here that the purpose of a carbon tax is to use like Quota over time. The tax rate should be high enough to shift the usage to green energy instead of just raising money.

To address the growing inequalities, the Author proposes a tax system that focuses on the "pre-distribution of wealth" to minimize its redistribution. To achieve that, *Windfall Profit Tax* could be applied to the outsized business success above a certain threshold, such as when a company's market capitalization exceeds \$1 billion or \$10 billion. The objective is to share the success with the society as it has some roots in either endowed natural resources which have been privatized or the accumulative inventions often sponsored by government research. For example, there will not be any Google or Facebook without the internet.

Income inequality appears insignificant in comparison to wealth inequality. The wealth creation possibility of the capitalist system allows individuals' wealth to grow to some billions even when unemployment hits an all-time low. Therefore, the predistribution of individual wealth is essential to the regenerative system. Another Windfall Profit Tax should kick in to cap the individual wealth in the system.

Lastly, an *Estate Tax* should be placed on the vast dynastic fortunes that are passed untaxed to the next heir. Beyond a certain amount per individual, all surplus wealth should be recycled for the common good. It can be imposed either through direct

taxation or with the option to donate to legitimate charities of one's own choice.

Threshold value could be debated in society. On the other hand, the non-profit sector should be organized along the fractal structure, likewise the private sector. So that donations given to charities could be circulated where it is needed the most.

5.6 Test Sovereign Money

Modern monetary theory (MMT) calls for a fresh look at how we use money. It argues that government that has their currency can print more anytime they want without many implications (Fullerton, 2018c). For example, In response to the financial crisis of 2008, central banks of different countries virtually printed billions in their home currency. They infused them into the economy without much expectation of inflation. A similar initiative was taken during the Covid crisis to support the economy. Hence, it is evident that it can be done; however, its long-term consequences are yet to be seen.

The MMT tool can play a huge role in meeting the massive unmet public investment needs. For instance, rapid investments of trillions of dollars are needed to transition our energy system, which is essential to mitigate climate change. Similarly, public investment to deal with vast inequalities in the education system is needed, and so on. The Federal Reserve should conduct experiments with sovereign money on a safe and significant scale to meet urgent needs. The knowledge gained from these experiments may be applied to various comparable trials to have a bigger impact. Also, sovereign money can be supplemented with a complementary currency.

5.7 Realign Fiscal spending and Investment Priorities

A financial system in service to the regenerative economy cannot be possible without transforming public investment priorities and flows. The public sector demands

an equal focus as the private sector for a regenerative world. Public sector investment's goal is in the interest of the public welfare rather than maximizing returns.

Total Federal, State, and Local expenditure in the USA for FY2020 is estimated to be approximately 38% of annual GDP (World Bank national accounts data, n.d.). Plausibly, the largest federal subsidy goes to the financial sector to protect the large banks. For example, per IMF, it is estimated that banks are given a \$70 billion subsidy per year in the US alone and larger across Europe. This is exclusive of Quantitative easing during financial crises and recent payouts in response to the covid crisis. Therefore, priorities must be changed, directing these flows following regenerative principles.

The US defense spending exceeded the following 11 countries combined. The excess military spending needs to be changed as it is degenerative looking from a regenerative lens. We need an industrial approach to defense rather than stockpiling nuclear weapons. A similar comprehensive approach is needed for education, healthcare, and social safety; all viewed through a regenerative lens.

Similarly, Subsidies for degenerative activities like fossil fuel subsidies must be discontinued. According to Oil Change International, it is estimated that direct global fossil fuel subsidies reached whopping \$1 Trillion annually.

There are some other fiscal spending and investment priorities along with policy preference mentioned by the author in this section. However, I have not covered all since some are in previous headings and some will cover in following sections. Few are not at all covered as their dynamics are not shown on map.

5.8 Realign Public Research Investment

Regenerative finance necessitates realignment and greater commitment to public investment in research. This is vital as we require innovation at an unprecedented scale for the systemic transformation we desire.

More commitment to public investment in the energy sector is needed to transform to green energy. This will be a challenge as the public sector balance sheet is already overburdened by debt from the post-2008 financial crisis and now Covid. Consequently, our leaders are compelled to take austerity measures when new investments are required. On the other hand, the private sector is making lesser long-term commitments due to the short-term demands of the market. These challenges could be overcome as described in earlier section like use of sovereign money. Also, private sector could be incentivized for collaboration with the public sector for more commercialization opportunities. These opportunities will encourage private capital to flow in this direction.

5.9 Redesign Philanthropic Incentives and Constraints to Accelerate Impact

Private foundations, small or big, play a huge role in our society, often where other institutions couldn't reach. However, in the current context of systemic crisis, the scale of philanthropy is insufficient and must meet the scale of change required. There are some great initiatives, such as the Giving Pledge to fill the gap; however, we need structural policy adjustments.

Also recommended in section 5.2, a steep estate tax above a certain threshold would encourage more voluntary pledges and stimulate a transfer of capital to these private foundations. *Estate tax* is feeding *Philanthropy Institution Reserve* and *Tax Revenue* on the map. Because few would trust the government to use these resources

effectively, so much of the assets would go into private foundations. However, the government should get a fair share of the wealth created by the system. These reserves will further feed *Public Research Investment*, *Number of Regenerative Projects*, and *Access to Resources for Low-Income Population* as its mission should be aligned with regenerative principles.

The author proposes some policy interventions to address the issues in philanthropy, such as accountability, perpetual foundation, and tax holidays; however, those are not covered in this map to show the simple functions of foundations.

5.10 Establish Capital Investment Review Board (CIRB)

The capital Investment Review Board (CIRB) would be a regulatory body that oversees the major real investment projects across the private and public sectors to analyze their regenerative qualities. The CIRB would review and grade individual projects to their alignment with regenerative principles. Any project that didn't meet a specific minimum grade could be red-flagged by the CIRB. This would encourage investors to work collaboratively to improve the regenerative nature of their projects to get them approved.

As seen in the earlier section of Limits to investment, there can't be exponential investment growth on a finite planet. This implies that vital investment can be accommodated by restraint consumption. However, there can be tradeoffs between investment and consumption, both of which are growth components. For example, to accommodate Green investment within planetary thresholds, all the non-essential investments should be terminated. CIRB would oversee such investment choices and embrace a scientifically determined threshold, say \$100 million or more, to avoid overshoot and collapse.

Reviewing of regenerative quality of all investments leads to disinvestment in degenerative projects and, ultimately, investments in regenerative projects as shown on the map.

These ten policy reforms or interventions are based on the vision of a regenerative world. Like any other reforms, there will be many critiques of these being unrealistic. But the author emphasizes that unlike many other failed efforts at financial reforms, these reforms differ in having a clear image of where he wants to take the future of finance.

6 Discussion

This research investigates how the system thinking process contributes to the regenerative finance theory. John Fullerton's writings on Regenerative Finance are referred to build the map. Further, the author was engaged, and the system map was presented to him. John confirmed that I effectively translated his text into a map.

This system map can be used as a communication tool to disseminate the idea of regenerative finance. It is easier, faster, and more effective to explain the theory with a system map. This System map helps make a coherent story using causal feedback loops, making it a powerful tool for explaining the complex complexity. The author also confirmed that the map helps to understand the concepts easily and logically compared to reading the whole theory. He agrees that it will be much use to someone who is not a finance person but wants to understand it.

Also, system map can effectively engage diverse stakeholders in the regenerative finance system. The system map makes the roles of all stakeholders explicit, enabling them to see their contribution and impact on the other stakeholders while understanding the interests of others. This improves the accountability and decision-making of stakeholders. For example, this map can be used by small productive business enterprises to engage with bankers about how their capital allocation affects their business and, eventually, the real economy—knowing their impact cause bankers to allocate more money to the real economy. John also agrees that he will use this map to engage his wall street friends who are stuck in their ideology and can't see how their actions impact the other systems.

Moreover, this map can be turned into an action map to bring a system change. It helps in identifying the leverage points that have the maximum impact. This compels the key stakeholders to take collective action. For instance, by curtailing excessive speculation and reducing leverage, the government could have the maximum impact on degenerating activities and make the whole system resilient.

Additionally, this map can be used for educational purposes to raise awareness among the public. It is easy to educate about the limitations of the current financial system and the new possibility of regenerative finance through this map. Public awareness about the systemic issues could compel the key stakeholders to act. This is also one of the author's purposes for writing articles on Regenerative finance. He uses the map in his newly introductory course in Regenerative Economics.

Lastly, System thinking helps make the systemic structure visible, which was not apparent in theory. Several important archetypes are discovered that were the basis for the financial crises in the past and could give rise to a new ones. For example, Success to the successful and fixes that backfire archetype in the banking sector that was the basis for the past financial crises. Another is the escalation archetype in the stranded assets case, which, if not addressed, would cause either market failure or climate change.

This map could be used by economists, Government, Scholars, Policymakers, Bankers, Business owners, Fund managers, and even students. All stakeholders in the regenerative finance system could use this map to engage with others. In general, this map can be used by anyone who wants to understand the flaws and participate in changing the system.

Besides engaging John Fullerton, I got to interview Brian Blankinship, who executed several real projects in SIMFO using system thinking methodology. Brian said, "People's mind has these complex mental models. It is difficult for them to express

as we are taught to communicate in a one-dimensional linear direction. Communication logic is hard to follow in the story when we add "but" or something else to think about. In the stories, we prize clarity, being articulate, and moving towards the goal. This is where system mapping is unique. It allows you to think in these feedback loops and non-linear ways. So, doing Map 1.0 is a gratifying experience for many people observing their mental model described on paper for the first time." This is in sync with john's comment that it is easy to understand and can be used to communicate effectively with other stakeholders.

6.1 Limitations and Further Research

One of the aims of this paper was to translate the regenerative finance theory into a system map. In doing so, I only considered John Fullerton's work. However, there are several other authors and professionals working in regenerative paradigm whose perspectives are not considered. Therefore, including them may lead to a different result than presented in this map.

7 Conclusion

By translating the regenerative finance theory into a system map, System thinking helps communicate the regenerative finance theory easily, quickly, and effectively. It also helps in engaging the stakeholders effectively. This system map can also be turned into an action map for collective action. Moreover, it can be used for educational purposes to raise awareness. Lastly, it adds value by making the system structure explicit, which is missing in theory.

References

- Arnold, R. D., & Wade, J. P. (2015). A Definition of Systems Thinking: A Systems Approach. *Procedia Computer Science*, 44, 669-678. https://doi.org/https://doi.org/10.1016/j.procs.2015.03.050
- Barton, D., Bailey, J., & Zoffer, J. (2016). Rising to the challenge of short-termism. *Focusing Capital on the Long Run (FCLT)*.
- Berger, A. N., Demsetz, R. S., & Strahan, P. E. (1999). The consolidation of the financial services industry: Causes, consequences, and implications for the future. *Journal of Banking & Finance*, 23(2), 135-194. https://doi.org/https://doi.org/10.1016/S0378-4266(98)00125-3
- Beslik, S. (2018). Could sustainable investing be the best way to tackle climate change? https://www.weforum.org/agenda/2018/03/could-this-be-the-best-way-to-tackle-climate-change-sustainable-investment
- Brundtland, G. H. (1987). Our common future—Call for action. *Environmental Conservation*, 14(4), 291-294.
- C., S. H. J. (1926). Holism and evolution, by General the Right Honorable J. C. Smuts.
- Caldecott, B. (2018). Stranded assets and the environment: Risk, resilience and opportunity. Routledge.
- Caniglia, B. S., Frank, B., Knott Jr, J. L., Sagendorf, K. S., & Wilkerson, E. A. (2019). Regenerative urban development, climate change and the common good. Routledge.
- Cha, M. (2013). What's missing from GDP. Demos. Retrieved August, 10, 2019.
- Costanza, R., Hart, M., Talberth, J., & Posner, S. (2009). Beyond GDP: The need for new measures of progress. *The pardee papers*.
- Craig, D. (2020). *Sustainable finance starts with data*. World Economic Forum. https://www.weforum.org/agenda/2020/01/sustainable-finance-starts-with-data/
- Davis, G. F. (2009). *Managed by the markets: how finance reshaped America / Gerald F. Davis*. Oxford University Press.
- Development, U. N. C. o. T. a. (2014). World Investment Report 2014: Investing in the SDGs: an Action Plan. https://doi.org/10.18356/ca95f7ed-en
- Díaz, S., Fargione, J., Chapin III, F. S., & Tilman, D. (2006). Biodiversity loss threatens human well-being. *PLoS biology*, *4*(8), e277.
- Doorman, F. (2015). Our Money: Towards a new Monetary system.

 http://positivemoney.org/wp-content/uploads/2015/10/Our-Money-06-4-2015-A5-Download-Positive-Money-28-8-2015-2.pdf
- Du Plessis, C. (2012). Towards a regenerative paradigm for the built environment. *Building Research & Information*, 40(1), 7-22.
- Fullerton, J. (2015). Regenerative Capitalism: How universal principles and patterns
- will shape our new economy. https://capitalinstitute.org/regenerative-capitalism/

- Fullerton, J. (2018a). Finance for a regenerative world: Act I. https://capitalinstitute.org/finance-for-a-regenerative-world/
- Fullerton, J. (2018b). Finance for a regenerative world: Act II. https://capitalinstitute.org/finance-for-a-regenerative-world/
- Fullerton, J. (2018c). Finance for a regenerative world: Act III. https://capitalinstitute.org/finance-for-a-regenerative-world/
- Fullerton, J. (2018d). Finance for a regenerative world: Act IV. https://capitalinstitute.org/finance-for-a-regenerative-world/
- Giller, K. E., Hijbeek, R., Andersson, J. A., & Sumberg, J. (2021). Regenerative agriculture: An agronomic perspective. *Outlook on Agriculture*, 50(1), 13-25.
- González-Márquez, I., & Toledo, V. M. (2020). Sustainability science: a paradigm in crisis? *Sustainability*, *12*(7), 2802.
- IPCC. (2018). Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. C. U. Press. https://doi.org/10.1017/9781009157940
- Ives, C. D., Freeth, R., & Fischer, J. (2020). Inside-out sustainability: The neglect of inner worlds. *Ambio*, 49(1), 208-217. https://doi.org/10.1007/s13280-019-01187-w
- Kim, D. H. (n.d.). Predicting behaviour using Systems Archetypes. https://thesystemsthinker.com/predicting-behavior-using-systems-archetypes/
- Lal, R. (2020). Regenerative agriculture for food and climate. *Journal of soil and water conservation*, 75(5), 123A-124A.
- Lenton, T. M., Rockström, J., Gaffney, O., Rahmstorf, S., Richardson, K., Steffen, W., & Schellnhuber, H. J. (2019). Climate tipping points too risky to bet against. *Nature*, 575(7784), 592-595. https://doi.org/10.1038/d41586-019-03595-0
- Levy, D. L. (2021). COVID-19 and Global Governance [Article]. *Journal of Management Studies*, 58(2), 562-566. https://doi.org/10.1111/joms.12654
- Meadows, D. H. (1994). Envisioning a Sustainable World. http://www.donellameadows.org/wp-content/userfiles/Envisioning.DMeadows.pdf
- Meadows, D. H., & Wright, D. (2008). *Thinking in systems : a primer / Donella H. Meadows ; edited by Diana Wright*. Chelsea Green Pub.
- Michael McLeay, A. R. a. R. T. (2014 Q1). *Money creation in the modern economy*. B. o. E. Quarterly & Bulletin. https://www.bankofengland.co.uk/quarterly-bulletin/2014/q1/money-creation-in-the-modern-economy
- Millennium ecosystem assessment, M. (2005). *Ecosystems and human well-being* (Vol. 5). Island press Washington, DC.
- Murphy, R. P. (2018). William Nordhaus versus the United Nations on Climate Change Economics. https://www.econlib.org/library/Columns/y2018/MurphyNordhaus.html

- Nations, U. (2015). Addis Ababa Action Agenda.

 https://www.un.org/development/desa/financing/document/addis-ababa-action-agenda
- Nations, U. (2018). The Sustainable development goals report 2018. https://unstats.un.org/sdgs/report/2018
- Nations, U. (2020a). The Sustainable Development Agenda. https://www.un.org/sustainabledevelopment/development-agenda/
- Nations, U. (2020b). *The Sustainable Development Goals Report 2020*. U. DESA. https://sdgs.un.org/publications/sustainable-development-goals-report-2020-24686
- OECD. (2011). The Economic Significance of Natural Resources: Key Points for Reformers in Eastern Europe, Caucasus and Central Asia. O. Publishing. https://www.oecd.org/env/outreach/2011 AB Economic% 20significance% 20of % 20NR% 20in% 20EECCA ENG.pdf
- Pizzi, S., Rosati, F., & Venturelli, A. (2021). The determinants of business contribution to the 2030 Agenda: Introducing the SDG Reporting Score [Article]. *Business Strategy and the Environment*, 30(1), 404-421. https://doi.org/10.1002/bse.2628
- Pörtner, H. O., Roberts, D. C., Adams, H., Adler, C., Aldunce, P., Ali, E., Begum, R. A., Betts, R., Kerr, R. B., & Biesbroek, R. (2022). Climate change 2022: impacts, adaptation and vulnerability.
- Refinitiv. (2020). Sustainable Financial Review.

 https://www.refinitiv.com/content/dam/marketing/en_us/documents/reports/sustainable-finance-review-first-nine-months-2020-hsbc.pdf
- Roland, E., & Landua, G. (2015). Regenerative enterprise: Optimizing for multi-capital abundance. Lulu Press, Inc.
- Schreefel, L., Schulte, R., De Boer, I., Schrijver, A. P., & Van Zanten, H. (2020). Regenerative agriculture—the soil is the base. *Global Food Security*, 26, 100404.
- Stroh, D. P. (2015). Systems Thinking for Social Change: A Practical Guide to Solving Complex Problems, Avoiding Unintended Consequences, and Achieving Lasting Results. Chelsea Green Publishing. http://ebookcentral.proquest.com/lib/ntuedu/detail.action?docID=5149077
- Taplin, D. H., Clark, H., Collins, E., & Colby, D. C. (2013). Theory of change. Technical papers: a series of papers to support development of theories of change based on practice in the field. ActKnowledge, New York, NY, USA.
- Tracker, C. (2011). *Unburnable Carbon: Are the World's Financial Markets Carrying a Carbon Bubble?* C. T. Initiative. https://carbontracker.org/reports/carbon-bubble/
- Tracker, C. (2017). *Stranded Assets*. Carbon Tracker Initiative. https://carbontracker.org/terms/stranded-assets/
- Turner, A. (2016). Between debt and the devil: money, credit, and fixing global finance / Adair Turner. Princeton University Press.
- United Nations Environment Programme, U. N. U. I. H. D. P. o. G. E. C. U.-I. (2012). Inclusive Wealth Report 2012: Measuring Progress Towards Sustainability. In. Cambridge, UK: Cambridge University Press.

- Wheelock, D. C. (2011). Banking industry consolidation and market structure: impact of the financial crisis and recession. *Federal Reserve Bank of St. Louis Review*, 93(6), 419-438.
- Woo, F. (2014). Regenerative Urban Development: a roadmap to the city we need.
- World Bank national accounts data, a. O. N. A. d. f. (n.d.). *GDP* (*current US\$*). https://data.worldbank.org/indicator/Ny.Gdp.Mktp.Cd
- WWF. (2016). *Living Planet Report 2016*. *Risk and resilience in a new era*. W. International. https://www.worldwildlife.org/pages/living-planet-report-2016

Appendix A: System Map of Regenerative Financial System

Appendix A: System Map of Regenerative Financial System

